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Objective

BIOLOGY

ZOOLOGY & BOTANY

Chapterwise & Subtopicwise

MCQ's

50,000

VOLUME-I

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BIOLOGY Volume-1

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01 DIVERSITY IN THE LIVING WORLD

A. Defining Properties of Living Organism

1. Pheromone is

(a) a product of endocrine gland
(b) used for animal communication
(c) messenger RNA
(d) always protein

Rajasthan PMT-2009
Punjab MET-2009
UP CPMT-2009
AMU-2002

Ans. (b) : Pheromones are chemical substance produced by animals, including humans remains uncertain, which are used to communicate with other of the same species. These chemicals are often released into the environment and detected by other animals through the sense of smell and triggering a specific behavioral response.

2. The difference between holophytic nutrition and holozoic nutrition is?

(a) Holophytic is autotrophic nutrition, while holozoic is ingestion of solid organic food
(b) Holophytic is autotrophic nutrition, while holozoic is the utilization of energy on oxidation of substances
(c) A complete uptake of nutrition is holophytic and synthesis of the food on their own is holozoic
(d) Synthesising their own food is holophytic and depending on their chemicals in the environment, it is called holozoic

TS EAMCET-10.08.2021 Shift-I

Ans. (a) :

Holozoic Nutrition	Holophytic Nutriton
(i) Holozoic nutrition is a type of heterotrophic nutrition	(i) Holophytic nutrition is a type of autotrophic nutrition.
(ii) Holozoic nutrition is found in animals	(ii) Holophytic nutrition is found in plants.
(iii) Holozoic nutrition uses an organic carbon source.	(iii) Holophytic nutrition uses an inorganic carbon source.
(iv) E.g. Amoeba, humans, dogs etc.	(iv) E.g. Green plants, Cyanobacteria, Algae etc.

3. The Technically complicated feature of all living organisms _____

(a) Growth (b) Metabolism
(c) Irritability (d) Reproduction

AP EAMCET-05.10.2021 Shift-I

Ans. (c) : The technically complicated feature of all living organisms is irritability means they are able to sense their environment and respond to environmental stimuli which could be physical, chemical or biological.

- Metabolism is sum total of all biochemical reactions metabolism shown by all living organisms without any exception isolated metabolic reaction in vitro are surely living reaction.
- Growth and reproduction are not diagnostic feature of living organisms because growth can be shown by non living organism eg- formation of stone by the deposition of sand particle which is not a true growth.
- Sum sterile organism like mules, worker bees are not able to produce their offspring.

4. Identify the wrong statement among the following.

(a) All living organisms of present, past and future are linked to one another
(b) Cellular organelles properties are similar due to the interaction of molecular components
(c) Organisational complexity will be lower in hierarchy of the organisms
(d) All organisms have consciousness

TS EAMCET-09.08.2021 Shift-I

Ans. (b&c) : To varied degree, all living things-past, present and future-are connected to one another through the sharing of a common genetic material.

• All organism, prokaryotic and the most advanced eukaryotes have a form of consciousness that allows them to perceive and react to environmental cues. Thus it is believed that consciousness is the characteristic that distinguishes all living things.

Hence, option (b) and (c) are the wrong statements.

5. Mark the decreasing order of complexity in the given living systems

(A) Cell **(B) Organ**
(C) Tissue **(D) Biosphere**

(a) A > B > D > C (b) D > B > C > A
(c) A > C > B > D (d) B > C > A > D

TS EAMCET-12.05.2017

Ans. (b) : The decreasing order of complexity in the living system, they can be arranged as-

Biosphere > organ > tissue > cells

Atom → molecule → Biomolecule → Cells → Tissue → Organ → Organ system → Organism → Population → Biosphere (Include Atmosphere, Lithosphere, Hydrosphere) It shows increasing order of complexity.

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6. Metabolism, replication and homeostasis are the main characteristics of

(a) eukaryotes (b) prokaryotes
(c) organisms (d) viruses

AMU-1997

Ans. (c) : Metabolism, replication and homeostasis are the main characteristic of organisms.
Metabolism– It is a defining feature of all living organism without exception. All plants, animals, fungi & microbes exhibit metabolism.
Homeostasis– It is refers to the ability of an organism to maintain the internal environment of the body within limits that allow it to survive.
Replication– DNA replication is one of the most basic processes that occurs within a cell of an organism.

7. The type of nutrition where organisms engulf food materials is

(a) Saprozoic (b) Autotrophic
(c) Holozoic (d) Saprophytic
(e) Parasitic

Kerala PMT-2009

Ans. (c) : The **Holozoic** nutrition is a kind of heterotrophic nutrition that is characterised by engulfing food in the form of solid as well as liquid.
Eg. Amoeba show most prominent example of holozoic nutrition.
Saprozoic - The organism which feed on dead and decaying materials.
Autotrophic - The organism which synthesize their food in presence of sunlight.
Eg- Green plant and chemoautotrophic bacteria.
Parasitic - The organism which feed on other organism. eg, Pathogenic bacteria, Fungi, Protozoa etc.

8. During endocytosis,

(a) the cell digests itself
(b) the cell engulfs and internalises materials using its membrane
(c) the cell enables the extracellular digestion of large molecules
(d) the cell divides its cytoplasm during mitosis

Karnataka CET-2009

Ans. (b) : Endocytosis is a cellular process in which substance are brought into the cell. The term includes to similar process they are phagocytosis (cell eating / engulfs) and pinocytosis (cell drinking).
Exocytosis is a process for moving large molecules out of the cell to the cell exterior.

9. The living organisms can be unexceptionally distinguished from the non-living things on the basis of their ability for:-

(a) Growth and movement
(b) Responsiveness to touch
(c) Interaction with the environment and progressive evolution
(d) Reproduction

AIPMT-2007

Ans. (c) : Metabolism is a defining feature of all living organisms without exception. All organism therefore are ' aware' of their surroundings i.e. consciousness.
Hence, metabolism and consciousness are defining feature of living organism without any exception.
• Non living thing do not interact with the environment and they do not evolve.

10. Biological organization starts with:-

(a) Atomic level
(b) Submicroscopic molecular level
(c) Cellular level
(d) Organismic level

AIPMT-2007

Ans. (b) : The living organism are arranged from single organism to complex.
• The cell is the basic unit of all living organisms.
• The biological organization starts with the submicroscopic molecular level.

11. Many elements are found in living organisms either free or in form of compounds. One of the following is negligible is living organisms

(a) Silicon (b) Magnesium
(c) Iron (d) Sodium

JIPMER-2014

Ans. (a) : Silicon element is used as the semiconductor. Silicon is not free in nature but it does occurs as oxide and silicate whereas magnesium, iron and sodium are present in the living organism as ion.
Silicon is essential to plant life but is often found in minute quantities in human body.

12. On the basis of nutritionally wild type organism, which does not require any additional growth supplement is known as :-

(a) Holotype (b) Auxotroph
(c) Prototroph (d) Phenotype

CMC Ludhiana-2009
AIPMT-2004

Ans. (c) : A micro-organism that has the same nutritional requirements as the parent organism. Phototrophs are organism that use light as their source of energy to produce ATP and carryout various cellular processes.
• An autotroph is an organism that produces complex organic compounds using carbon from simple substances such as carbon dioxide generally using energy from light or inorganic chemical reactions.

13. Ants locate sucrose by

(a) Using a strong sense of smell
(b) Using keen sense of vision
(c) Physical contact with sucrose
(d) Sensing the particular wavelength of light emitted/reflected by sucrose

KVPY (SA)-2010

Ans. (c) : Ants can smell food using their antennae, which can detect minute odours but sugar actually do not have a smell. Therefore, when the scout worker ants locate sugar while foraging, they take a piece back home to the colony while doing this the ant will leave a chemical trial which the other ants can follow.
Hence, ants locate sucrose by physical contact with sucrose.

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14. Pheromones when secreted upon the skin surface, its odour generally affects:
(a) skin colour
(b) genitalia
(c) breast
(d) mutual behaviour of members of a species

JCECE-2002

Ans. (d) : The odour of pheromones affects the mutual behavior of member's of species because pheromone is a substance which is secreted by an individual on the skin surface to sexually attract an individual of another sex.

B. Diverseness in the living world

15. Reason of diversity in living beings is
(a) mutation
(b) long term evolutionary change
(c) gradual change
(d) short term evolutionary change

Manipal-2013
BHU PMT (Screening)-2010

Ans. (b) : Evolution gives rise to new species which is responsible for diversity in living beings.
- Evolution is a slow process of gradual change occurring in organism leading to the formation of new species. Organisms living in different environments would adapt and slowly change over time. This ultimately leads to the formation of new species. When this happens continuously, large number of species are formed leading to diversity in organisms.

16. The first organisms to appear on earth were
(a) photoautotrophs (b) chemoautotrophs
(c) chemoheterotrophs (d) coacervates

AMU-1997

Ans. (c) : The first organisms to appear on earth were chemohetrotrophs. Early chemohetrotrophs did not have the capability of using carbon dioxide from their surroundings to make their own organic compounds. They directly consume organic compounds. They directly consume organic molecules for both a source of carbon as well as energy.

17. The book Micrographia was written by :
(a) Huxley (b) Robert Hooke
(c) Fritsch (d) J. D. Hooker

BCECE-2002

Ans. (b) : The book **"Micrographia"** was written by Robert Hooke. The book Micrographia was the first important work on microscopy, the study of minute objects through a microscope first published in 1665.
- J.D. Hooker along with George Bentham, published **Genera Plantarum** having their natural system of classification.
- Fritsch give comprehensive classification of algae.

18. Philosophic Zoologique was written by :
(a) Lamarck (b) De Vries
(c) Mendel (d) Spencer

BCECE-2003
UP CPMT-2001

Ans. (a) : Philosophic Zoologique was a book written by French naturalist Jean- Baptiste Lamarck in 1809 in which he outlines his theory of evolution now known as Lamarckism.
- De Vries- wrote the book species and varieties and their origin by mutation.
- Mendel wrote the book experiments on plant hybridization.
- Spencer was an English sociologist who wrote the book the principle of psychology.

19. Organisms which obtain energy by the oxidation of reduced inorganic compounds are called
(a) Photo autotrophs (b) Chemoautotrophs
(c) Saprozoic (d) Coproheterotrophs

AIPMT-2002

Ans. (b) : The organisms which obtain energy by the oxidation of reduced inorganic compounds are called **chemoautotrophs**. When the reductants obtains from the environment in inorganic form then organism are chemoautotrophs.
- **Photoautotrophs** make their food by photosynthesis using the energy of sun.
- **Saprozoic organism** obtain food from the dead and decaying matter.

20. Out of 1.7 million species of living organisms known to us, insects contributes to about
(a) 0.7 million (b) 70000
(c) 70 lakh (d) One lakh

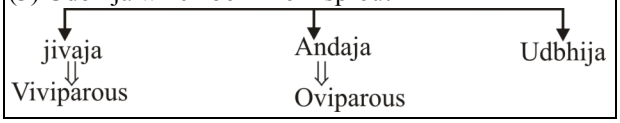
CMC Vellore-2012

Ans. (a) : According to present data, it reveal that 1.7 million living organisms are known to science, in which 1.2 million are animals and 0.5 million are plants. However, Insects have 0.7 million species.

21. In vedic times, living organisms were classified into following number of classes:
(a) 2 (b) 3
(c) 4 (d) 5

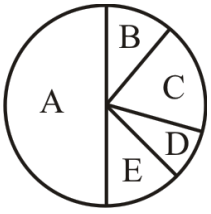
BCECE-2015

Ans. (b) : In vedic (Ancient) time, living organisms are classified into three main categories namely-
(1) Jivaja which born from womb that is viviparous.
(2) Andaja which born from egg. That is oviparous.
(3) Udbhija which born from sprout



22. Given below is the representation of the extent of global diversity of vertebrates. What groups does the portions represent?

VERTEBRATES



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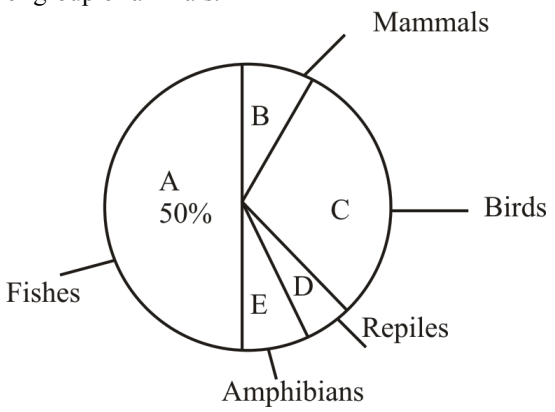
	A	B	C	D	E
(a)	Mammals	Birds	Fishes	Amphibians	Reptiles
(b)	Fishes	Mammals	Birds	Reptiles	Amphibians
(c)	Birds	Reptiles	Fishes	Mammals	Amphibians
(d)	Fishes	Amphibians	Mammals	Birds	Reptiles

Karnataka CET-2015

Ans. (b) :

Fishes	Mammals	Birds	Reptiles	Amphibians

Fishes covers about 50% of global diversity then it follow by birds about 35% – 40% then followed by other group of animals.



C. Taxonomic Categories

23. The basic unit of classification is

(a) species (b) taxon
(c) category (d) sub-species

J&K CET-2013
JIPMER-2011
BVP-2009,2010
Uttarakhand PMT-2009
J&K CET-2011 VMMC-2009
J&K CET-2008
CG PMT-2007
AIPMT-2003
AIIMS-1990,2000
Rajasthan PMT-1996,1997

Ans. (a) : A species is a group of similar organisms that are capable of interbreed and produce fertile offspring. The basic unit of classification is species constitute a group of phenotypically similar organism with common ancestry that can interbreed freely to produce fertile progeny and Hence, species is considered the basic unit of classification.

24. The term taxonomy was coined by

(a) De Candolle (b) Linnaeus
(c) John Ray (d) Bauchin

Tripura JEE-2018
J&K CET-2011
BVP-2010

Ans. (a) : The term 'taxonomy' was coined by A.P de Candolle. AP de Candolle was a Swiss Botanist and he also proposed a natural method to classify plants.
- The term 'Systematic' was coined by Linnaeus.
- The term family, genus and species was given by - John Ray (1663).

25. Taxon is the unit of:

(a) order (b) species
(c) taxonomy (d) genus

J&K CET-2013
BHU PMT-2002
Haryana PMT-2000
AIPMT-1996

Ans. (c) : Taxa (sing-taxon) are the different groups or Categories used in classification. Each taxon represents a category or rank in classification. Taxon is the unit of taxonomy. The term, 'taxon' was given by Adolf Meyer (1926).
- Such as species, family or class.
- Species is the lowest level of classification

26. A group of plants or animals with similar traits of any rank is

(a) species (b) genus
(c) order (d) taxon

BVP-2012
MGIMS Wardha-2007
AIPMT-1992, 1991

Ans. (d) : A group of plants or animals with similar traits of any rank is taxon. All the organism belonging to a similar taxon share similar traits. For example, the basic level of classification is species followed by genus, family, order, class, phylum or division in ascending order.

27. Species is a

(a) group immediately below a phylum
(b) closely related interbreeding population
(c) taxonomic division of similar genera
(d) closely related non-breeding population

Manipal-2012, 2011
AFMC-2002

Ans. (b) : John ray gave the term 'species' in 1693.
- Population of closely related inter breeding individuals is called species.
- Each species is reproductively isolated from other species.
- One species can be differentiated from other closely species on the basis of distinct morphological differences.
- The number of known and describe species range from 1.7 - 1.8 million.

28. A taxon is

(a) a group of related organism
(b) a taxonomic group of any ranking
(c) a group of related species
(d) a group of related genus

VMMC-2014
CG PMT-2007
DUMET-2006
Rajasthan PMT-2001
AIPMT-1992,1990

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Ans. (b) : A taxon is term used for any taxonomic unit that is recognized or defined by atleast one of the nomenclature codes. The taxa at different hierarchial levels are species, genus, family, order, class, phylum and kingdom.

29. Biological concept of species is mainly based on

(a) reproductive isolation
(b) morphological features only
(c) methods of reproduction only
(d) morphology and methods of reproduction

HP CET-2012
Rajasthan PMT-2008
UP CPMT-2008

Ans. (a) : Biological concept of species is mainly based on reproductive isolation is proposed by Ernst Mayr.
Reproductive isolation is defined as the inability of a species to breed successfully with its related species because of the behavioral, geographical, physiological or genetic barriers or differences.

30. Select the correctly matched pair of organisms with their order.

(a) Mangifera, indica : Primata
(b) Triticum, aestivum : Sapindales
(c) Musa, domestica : Diptera
(d) Homo, sapiens : Poales

Karnataka CET-20.05.2023

Ans. (c) : Musca domestica is the biological name of housefly. It is most common fly species found in house. It is a common insect of family muscidae and order diptera. It belongs to the class insecta and phylum Arthropoda.

31. Potato and Brinjal differ in this taxon

(a) Species (b) Genus
(c) Family (d) Order

AP EAPCET-11.05.2023, Shift-II

Ans. (a) : Each category, referred to as a unit of classification, represent a rank commonly termed as taxon.
Brinjal and potato belong to the same genus solanum, but two different species. The main criteria for defining two species is that they can not cross or interbreed and produce fertile offspring.

32. Read and find the correct statement from the given below

(A) Species is a group of individual organisms with fundamental dissimilarities.
(B) Few similar characters are assigned to a higher category in a division.
(C) A decrease in number of common characters is observed from species to kingdom.
(D) Lower taxa shares more characters within the members.

(a) ABC (b) ACD
(c) BCD (d) ABD

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Taxonomic categories from species to kingdom have been show in ascending order starting with species.
As we go higher from species to kingdom, the number of common characteristic goes on decreasing.
Few similar characters are assigned to a higher category in a division.
Lower taxa share more characters within the members.

33. Match List I with List II :

	List I		List II
A.	**Heroin**	**I.**	**Effect on Cardiovascular system**
B.	**Marijuana**	**II.**	**Slow down body function**
C.	**Cocaine**	**III.**	**Painkiller**
D.	**Morphine**	**IV.**	**Interfere with transport of dopamine**

Choose the correct answer from the options given below :

(a) A-III, B-IV, C-I, D-II
(b) A-II, B-I, C-IV, D-III
(c) A-I, B-II, C-III, D-IV
(d) A-IV, B-III, C-II, D-I

NEET (UG) 07.05.2023

Ans. (b) : The main effects of **heroin-**
- Intense pleasure and pain relief.
- Relaxation, drowsiness and clumsiness.
- Confusion.
- Feelings of detachment.
- Slow down body function.
- **Marijuana** - Smoking weed has triggered heart attacks and to a higher risk of strokes and heart failure in people with underlying heart disease.
- **Cocaine** - The pain killing effects work by blocking the transmission of pain impulses from the nerves to the brain, allowing it to be used as a local anesthetic.
- **Morphine** is used to relieve severe pain, such as pain caused by a major trauma or surgery, labour pain in child birth or cancer pain.

34. Assertion (A): Species is dynamic.
Reason (R): It is the basic unit of classification
The correct option among the following is

(a) (A) is true. (R) is true and (R) is the correct explanation for (A)
(b) (A) is true. (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-II

Ans. (b) According to it "species is always changeable" there are many changes occur in species time to time. Changes always occur in characters of species from one generation to the next generation, and these changes are called as evolution.
Dynamic concept of species put forwarded by Lamarck.

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• It is assemble a group of phenotypically similar organism with common ancestry - that can interbreed freely to produce fertile progeny.
Hence, species is considered as basic unit of classification.

35. Identify the organism with correct sequence of taxa in hierarchy from the following.

(a) Homo – sapiens – Mammalia – Chordata – Hominidae
(b) Triticum – vulgare – Poales – Monocotyledonae – Spermatophyta
(c) Domestica – Musca – Muscidae – Diptera – Insecta
(d) Sapindales – Dicotyledonae – Mangifera – indica – Anacardiaceae

TS EAMCET-31.07.2022 Shift-II

Ans. (c) : The correct sequence of taxa of Housefly in hierarchy from the following is -

Kingdom — Animalia
↑
Phylum — Arthropoda
↓
Class — Insecta
↓
Order — Diptera
↓
Family — Muscidae
↓
Geneus — Musca
↓
Species — domestica

36. Theory and practice of identification, nomenclature and classification of organisms is called

(a) Morphology (b) Anatomy
(c) Taxonomy (d) Ecology

TS EAMCET-30.07.2022 Shift-I

Ans. (c) : Taxonomy is the theory and practice of identification, nomenclature and classification of organisms and includes all plants, animals and microorganisms of the world. The father of taxonomy is Carolus Linnaeus (1707 – 1778).

37. Assertion (A) : Species is dynamic.
Reason (R) : Species are in a continuous process of adapting to the conditions of their surrounding environments.
The correct option among the following is

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-I

Ans. (a) : Species is dynamic in nature due to various reason like mutation, environmental effect, variation in geographical distribution etc.
Species are in a continuous process of adapting to the conditions of their surrounding environments.
Hence, both are correct and reason is correct explanation for assertion.

38. A group of individual organisms with fundamental similarities is called as

(a) Genus (b) Family
(c) Species (d) Order

AP EAPCET-11.07.2022 Shift-I

Ans. (c) : A group of individuals organisms with fundamental similarities is known as species.
Species is a group of organisms that can reproduce naturally with one another and create fertile offspring.

39. The hierarchical arrangement of taxonomic categories in descending order is

(a) Kingdom, phylum, class, order, family, genus, species
(b) Kingdom, division-phylum, order, family, genus, species
(c) Kingdom, class, phylum, order, family, genus
(d) Division, kingdom, class, phylum, order, family, genus, species

NEET-2022
AMU-2012

Ans. (a) : Kingdom
↓
Phylum
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

•Taxonomic categories showing hierarchical arrangement in descending order.

40. Assertion (A) : Numerical Taxonomy require mathematical methods and computer.
Reason (R) : All characters are given codes, numbers and with equal importance, and hundreds of character are to be evaluated.
The correct option among the following is :

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

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Ans. (a) : Numerical taxonomy is the analysis of various types of taxonomic data by computerized or mathematical methods. It aims to create a taxonomy using numeric algorithms like cluster analysis rather than using Subjective evaluation of their properties.

Each character is given equal importance and at the same time hundreds of characters can be considered in Numerical taxonomy.

41. Taxon 'Tigris' represents _____ .

(a) Class (b) Species
(c) Family (d) Genus

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Tigris represent species

Kingdom	:	Anemalia
Phylum	:	Chordata
Class	:	Mammalia
Order	:	Carnivora
Family	:	Felidae
Subfamily	:	Pantherinae
Genus	:	Panthera
Species	:	tigris

42. Amongst all the kingdoms, the only taxon that exists in nature as a biologically cohesive unit is the _____

(a) Phylum (b) Species
(c) Genus (d) Kingdom

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Species is the lowest taxon in taxonomic hierarchy. Which helps in describing the organisms and their characteristics that can successfully interbreed and produce fertile offspring.

Species is only taxon that exist as biologically cohesive unit.

43. Assertion (A) :Species is an ecological unit.
Reason (R) : Species have similar structure and functional characteristics.
The correct option among the following is
Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Species is an ecological unit because individuals make up a population, make up a species and multiple species makes a community.

A species is group of organisms that can reproduce naturally with one another and create fertile offspring. Species have similar structure and functional characteristics.

44. Study the following table which shows different organisms with their taxonomic categories. Select the correct option for A,B, C and D?

Common name	Biological name	Genus	Family	Order	Class	Phylum / Division
Man	Homo sapiens	Homo	Hominidae	Primata	Mammalia	A
Housefly	Musca domestica	Musca	Muscidae	Diptera	B	Arthropoda
Mango	Mangifera indica	Mangifera	C	Sapindales	Dicotyledonae	Angiospermae
Wheat	Triticum aestivum	Triticum	Poaceae	Poales	D	Angiospermae

(a) A- Chordata, B- Insecta, C- Anacardiaceae, D- Monocotyledonae
(b) A-Animalia, B- Arachnida, C- Anacardiaceae, D- Monocotyledonae
(c) A- Chordata, B- Arachnida, C-Polygonaceae, D- Monocotyledonae
(d) A-Non-Chordata, B-Insecta, C- Anacardiaceae, D- Dicotyledonae

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : Man comes under phylum- Chordata.
- Housefly comes under class - Insecta.
- Mango comes under family of - Anacardiaceae.
- Wheat comes under class - Monocotyledonae.

45. Match the following lists

List -I	List - II
A. Genera plantarum	**I. Theophrastus**
B. Species plantarum	**II. Bentham and Hooker**
C. Historia plantarum	**III. Hutchinson**
D. Families of flowering plants	**IV. Linnaeus**
	V. Engler and Prantl

The correct match is

	A	B	C	D
(a)	II	IV	III	V
(b)	II	IV	I	III
(c)	II	I	III	IV
(d)	IV	II	V	III

TS EAMCET-29.09.2020 Shift-I

Ans. (b) :

List -I	List - II
A. Genera plantarum	–Bentham and Hooker
B. Species plantarum	–Linnaeus
C. Historia plantarum	–Theophrastus
D. Families of flowering plants	– Hutchinson

46. Identify and arrange the following taxonomic categories in ascending order.

(A) Hominidae **(B) Triticum**
(C) Spermatophyta **(D) Sapiens**
(E) Primata **(F) Insecta**

Options:

(a) D, A, B, F, E, C (b) D, B, E, A, F, C
(c) A, B, C, D, E, F (d) D, B, A, E, F, C

TS EAMCET-28.09.2020 Shift-I

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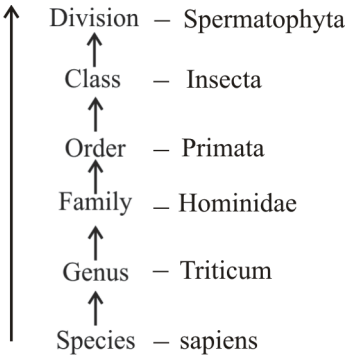
Ans. (d) :

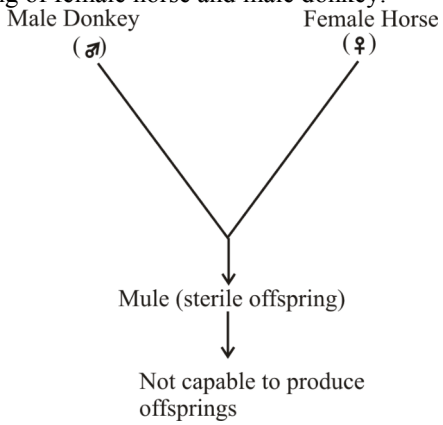


Taxonomic categories in ascending order.

47. Assertion (A) : Species is a breeding unit.
Reason (R) : Closely related species of a genus can interbreed, but they generally give rise to sterile offspring.
The correct option among the following is:
(a) Both A and R are true, R is correct explanation for A
(b) Both A and R are true, R is not correct explanation for A
(c) A is true, But R is false
(d) A is false, But R is true

TS EAMCET-29.09.2020 Shift-I

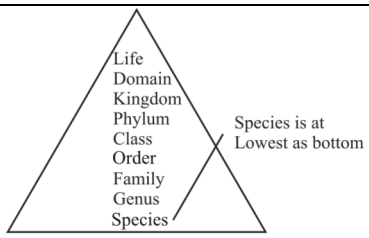
Ans. (b) : Species is a breeding unit, Species are reproductively isolated from individuals of other species.
In nature there are some example where closely related species of a genus can interbreed, but they generally give rise to sterile offsprings. This phenomenon is best example of interspecies hybridization. Mule is an offspring of female horse and male donkey.



48. In the hierarchy of classification, the lowest obligatory category in five kingdom classification is
(a) Order (b) Species
(c) Phylum (d) Class

TS EAMCET-29.09.2020 Shift-II

Ans. (b) : In the hierarchy of classification, the lowest obligatory category in five kingdom classification is species.
This hierarchy according to five kingdom system are as follows -



49. Assertion (A): Species is an evolutionary unit
Reason (R): Having similarity in structural and functional characteristics
The correct option among the following is
(a) Both A and R are true. R is correct explanation of A.
(b) Both A and R are true. R is not correct explanation of A.
(c) A is true but R is false
(d) A is false but R is true

TS EAMCET-29.09.2020 Shift-II

Ans. (a) : According to Simpson (in 1961) it is "an evolutionary species is a lineage" (an ancestral - descendant sequence of populations) evolving separately from others and with its own unitary evolutionary role and tendencies".
• Species having similarity in structure and functional characteristics hence species have similarity in morphology, size and also similar in function or physiology.

50. Highest unit of classification
(a) phylum (b) kingdom
(c) class (d) series

MHT CET 5.10.2020 Shift-I
CG PMT-2006

Ans. (b) : Highest unit of classification is kingdom . It has the largest number of organism with lowest number of similarities. Living organisms are classified into five kingdom - Monera, Protista, Fungi, Plantae and Animalia.

51. The Study of external features is called ____
(a) Morphology (b) Anatomy
(c) Taxonomy (d) Astronomy

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : In biology the study of external feature of living organism is called morphology this can include the physical characteristic of an organism such as its shape , size colour, and other visible traits.

52. Match the following

	Set-I		Set-II
A	The black buck	i	*Grus leucogeranus*
B	Kashmiri stag	ii	*Panthera leo persica*
C	Pygmy hog	iii	*Antelope cervicapra*
D	Siberian Crane	iv	*Cervus elaphus hanglu*
		v	*Sus salvanius*

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The correct match is

	(A)	(B)	(C)	(D)
(a)	i	ii	iv	iii
(b)	iii	iv	v	i
(c)	v	i	iv	ii
(d)	i	iii	iv	ii

TS EAMCET-09.05.2019 Shift-I

Ans.(b):

List - I	List-II
(A) The black buck	*Antilope cervicapra*
(B) Kashmiri stag	*Cervus elaphus hanglu*
(C) Pygmy hog	*Sus salvanius.*
(D) Siberian crane	*Grus leucogeranus*

53. Assertion (A): Classification is grouping into categories based on observed characters and the categories are referred as taxon.
Reason (R): Taxa are unbiased and indicative of categories at different levels in classification.
The correct answer is:
(a) Both (A) and (R) are true, (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.05.2019 Shift-I

Ans. (a) : Taxa is the scientific term for each unit or category of classification. It indicates at different levels. Group of living organisms indicates the taxon whether category indicates the status in the particular taxon.

54. Choose the correct set of taxonomic words belong to the given statements
(I) Taxonomic category showing individual organisms with fundamental similarities
(II) Taxonomic category with same hierarchical status
(i) Dicotyledonae (ii) domestica
(iii) indica (iv) Insecta
(v) Mangifera (vi) sapiens
(vii) Mammalia (viii) Monocotyledonae
(ix) vulgare
Options :
(a) ii, iii, vi, ix ; i, iv, vii, viii
(b) i, ii, iii, viii ; ii, iii, vi, ix
(c) i, ii, iii, iv ; v, vi, vii, viii
(d) iii, iv, v, vi ; vii, viii, ix, i

AP EAMCET-24.04.2019 Shift-I

Ans. (a) : (1) The taxonomical category showing individual organism with fundamental similarities include name of species of organism like- domestica, indica, sapiens, vulgare.
(2) Taxonomic category with same hierarchical status include taxa like - Insecta , Dicotyledonae, Mammalia and Monocotyledonae.

55. Statement (S) : Species is a breeding unit.
Reason (R) : A species is reproductively isolated from the individuals of the other species.
The correct answer is
(a) Both (S) and (R) are correct and (R) is the correct explanation to (S)
(b) Both (S) and (R) are correct but (R) is not correct explanation to (S)
(c) (S) is correct but (R) is not correct
(d) (S) is not correct but (R) is correct

TS EAMCET-08.05.2019 Shift-I

Ans. (a) : Species are groups of actually or potentially interbreeding population which are reproductively isolated from other such group. The biological species concept has been prevalent in the evolutionary literature for the last several decades and is emphasized in many college level biology courses.

56. The correct sequence of taxonomic categories is:
(a) class-phylum-order-family-genus-species
(b) phylum-order-class-genus-family-species
(c) division-class-family-genus-species-order
(d) phylum-class-order-family-genus-species

TS EAMCET-08.05.2019 Shift-II
TS EAMCET-02.05.2018 Shift-II,
AP EAMCET-2015
AFMC-2001

Ans. (d) : The correct sequence of taxonomic categories is the phylum-class-order-family-genus-species.
Here phylum is highest unit of classification and it has largest number of organism. Species is lowest unit of classification and it has least number of organisms but the species has the more common characters.

57. Identify the levels and hierarchy from the following in the classification of animal kingdom.
1. Family 2. Class
3. Phylum 4. Order
5. Genus 6. Species
(a) $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 6 \rightarrow 5$
(b) $4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 6 \rightarrow 5$
(c) $3 \rightarrow 2 \rightarrow 4 \rightarrow 1 \rightarrow 5 \rightarrow 6$
(d) $1 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 6 \rightarrow 5$

TS EAMCET-02.05.2018 Shift-II

Ans. (c) : There are seven divisions in the system:-
1. Kingdom 2. Phylum or Division
3. Class 4. Order
5. Family 6. Genus
7. Species.
Kingdom is the highest category and species is the lowest category.

58. Assertion (A) : Species is the lowest taxonomic category in the hierarchical arrangement and shows distinguishing characters from one species from other closely related species based on several phenotypic characters. However, as we go higher from species to kingdom the number of common characters goes on decreasing.
Reason (R) : All plants come under the highest category called kingdom, plantae, which has two major classes dicotyledonae and monocotyledonae.
Which of the following is true?

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(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) (A) is true, but (R) is false
(c) (A) and (R) are false
(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : The lowest category consists of a single species. Each of the categories above species can have numerous subcategories.
• Within the plant kingdom, plants are divided into two main groups. The largest group contains the plants that produce seeds. These are flowering plants (angiosperms) and conifers, Ginkgo, and cycads (gymnosperms).
• In angiosperms seeds are coverd by seed coat but in gymnosperms seeds are not coverd by seed coat. Angiosperms are further divided into two classes (i)Dicotyledonae (ii) Monocotyledonae.
Hence, both (A) and (R) are true, but (R) is not the correct explanation of (A)

59. The correct sequence of taxonomic hierarchy is
(a) Genus → Family → Class → Order → Phylum → Kingdom → Species
(b) Species → Genus → Family → Order → Class → Phylum → Kingdom
(c) Species → Family → Genus → Kingdom → Order → Class → Phylum
(d) Species → Genus → Family → Class → Order → Phylum → Kingdom

Karnataka CET-2018

Ans. (b) : Hierarchy is the process in which organisms are arranged into successive level decreasing or increasing order. There are seven categories. So correct answer is
species → genus →family → order →
class → phylum → kingdom

60. Match the following

List-I	List-II
(p) Order	**(i) Nigrum**
(q) Species	**(ii) Polemoniales**
(r) Family	**(iii) Solanum**
(s) Class	**(iv) Solanaceae**
	(v) Dicotyledonae

The correct answer is
Options :

	(p)	(q)	(r)	(s)
(a)	(ii)	(i)	(iii)	(v)
(b)	(iii)	(v)	(iv)	(ii)
(c)	(ii)	(i)	(iv)	(v)
(d)	(i)	(iii)	(v)	(ii)

TS EAMCET-02.05.2018 Shift-I

Ans. (c) : Polemoniales comes under Order. Nigrum comes under Species (eg. *Solanum nigrum*) Solanaceae comes under Family (like potato). Dicotyledonae comes under Class.

61. Identify the 'order' from the following:
(a) Carnivora (b) Muscidae
(c) Insecta (d) Panthera

Karnataka CET-2017

Ans. (a) : Carnivora is an order of placental mammals that have specialized in primarily eating flesh" whose members are formally referred to as carnivores.
• Muscidae are family of flies found in the super family muscidea.
• Insecta is a class under the phylum Arthropoda.
• Panthera is a genus within family Felidae.

62. Classical Taxonomy is based on
(a) Morphological traits
(b) Habitat of organisms
(c) Similarities and dissimilarities of behavior
(d) Phylogeny

AIIMS-2017

Ans. (a) : Classical taxonomy is based on morphological traits. Classical taxonomy is concerned with the classification of species, in which species serving as the fundamental unit. An organism divided into Domains, Kingdom, Phylum, Class, Order, Family, Genus and Species in the classification system. Systematic is another name for classical taxonomy or old systematic.

63. Which one is smallest unit of classification?
(a) Class (b) Order
(c) Species (d) Family

VMMC-2011
JIPMER-1997

Ans. (c) : Smallest unit of classification is species. The classification of organism in a specific sequence of categories either in an ascending order (starting from species and reaching up to kingdom) is called a hierarchy of categories. The hierarchy includes seven main obligate phylum, class, order, family, genus and species. The smallest unit of this hierarchical categorization is species and largest unit is kingdom.

64. Branch of biology dealing with study of organism in outer space is
(a) Exobiology (b) Ethology
(c) Euphenics (d) Ethnology

DUMET-2007

Ans. (a) : The branch of biology dealing with the study of organisms in outer space is called Exobiology or astrobiology. This field of study focuses on understanding the origin, evolution, distribution and feature of life. Exobiologist explore the potential habituality of other planets.

65. Scientific study of diversity of organisms and their evolutionary relationships is
(a) Morphology (b) Anatomy
(c) Taxonomy (d) Systematics

J&K CET-2011

Ans. (d) : Scientific study of diversity of organisms and their evolutionary relationship is called as systematics.
• The branch of biology which deals with structure and forms of organism (plants or Animals) called morphology.
• The branch of science deals with classification of living organism called taxonomy.
• The branch of biology that deals with the structure and identification of organism's body and their different sections, called anatomy.

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66. The term phylum was given by

(a) Haeckel (b) Linnaeus
(c) Cuvier (d) Theophrastus

MGIMS Wardha-2013
AIPMT-1992

Ans. (a) : The term phylum was given by Ernst Haeckel. The phylum is the taxonomic rank which is placed below kingdom and above the class. It is used to describe the classification of animal, division is the similar term used for plants.

67. Interbreeding population of animals is called :

(a) sub - species (b) species
(c) community (d) genus

MGIMS Wardha-2003

Ans. (b) : Interbreeding population of animal is called species. A species refer to a group of living organisms which are capable of interbreeding and producing fertile offsprings. They can be interbreed and reproduce.

68. Ambulacral grooves are absent in the living forms of the class

(a) Crinoidea (b) Ophiuroidea
(c) Asteroidea (d) Echinodermata

Punjab MET-1999

Ans. (b) : Ambulacral grooves are found in the arms of echinoderms lined by tube feet.
Ambulacral grooves are absent in Ophiuroidea (brittle stars) which are covered by ossicles.
Ambulacral are replaced by ossicles & Ambulacral grooves extend from the mouth to the end of each ray of arm of the animal.

69. Sequence of taxonomic categories is

(a) Division, class, family, tribe, order, genus, species
(b) Class, phylum, tribe, order, family, genus, species
(c) Division, class, order, family, tribe, genus, species
(d) Phylum, order, class, tribe, family, genus, species

VMMC-2013
AIPMT-1992

Ans. (c) : The correct arrangement of taxonomic categories in descending order from high, to lower in biological classification include following 7 obligatory categories. Kingdom → Phylum or Division → Class → Order → family → Tribe → Genus → species
• Tribe is a taxonomic category present between sub family and genus.

70. Phenetic classification is based, on

(a) sexual characteristics
(b) the ancestral lineage of existing organisms
(c) observable characteristics of existing organisms
(d) dendogram based on DNA characteristics

Manipal-2012

Ans. (c) : Phenetic classification is based on the observable characteristics of existing organisms.
Phenetic classification is simply understood as like they use many character to define the overall similarity of the special organism are group together based on the mutual similarity of their phenotype.
• It uses statistical method for evaluating similarities and differences finding out relationships, primitiveness and advancement of species with the help of all the known traits.

71. A group of related genera, with still less number of similarities as compared to the genus and species constitutes

(a) order (b) class
(c) family (d) division

DUMET-2010

Ans. (c) : A group of related genera with less no. of similarities are kept in a family taxonomic groups which comes between order & genus.
• Family is represented by a group of related genera that are more similar to each other than with the genera of other families.
Ex. A cat (Felis domestica) and a lion (Panthera leo) belongs to the "cat" family - Felidae.

72. The total number of species, that are known and described range between

(a) 0.5 - 1.0 million (b) 1.1 - 1.2 million
(c) 1.7 - 1.8 million (d) 2.5 - 3.0 million

DUMET-2010

Ans. (c) : The total number of species that are known and described range between 1.7-1.8 million. This refers to biodiversity or the number and type of organism present on earth.

73. Taxa differs from taxon due to this being

(a) a higher taxonomic category than taxon
(b) lower taxonomic category than taxon
(c) the plural of taxon
(d) the singular of taxon

DUMET-2010

Ans. (c) : Taxa differs from taxon (Singular) due to the plural of taxon.
A taxon is defined as a collection of one or more population of organism . Taxa are the hierarchical division of a species from kingdom to subspecies.

74. The number of species classified in Species Plantarum

(a) 5900 (b) 6000
(c) 4000 (d) 3800

DUMET-2008

Ans. (a) : Carl Linnaues introduced the Binomial system of Nomenclature in his book **"Systema Naturae"** published in 1758.
• All valid names for plants are the ones given by Linnaues in his book **"Species Plantarum"** published in 1753.
• It includes names & description of 5900 species of plants.

75. Which of the following belongs to the class Amphineura ?

(a) Chiton (b) Nautilus
(c) Dentalium (d) Pinctada

Uttarakhand PMT-2004

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Ans. (a) : Nautilus:- The only cephalopod that has an outer shell is the Nautilus genus.
Dentalium:- Under the genus' Dentalium' the elephant tusk is described.
• It is a scaphopod a mollusc genus
Pinctada:- It is a genus of marine bivalve mollusc that are salt water clams
• They belong to the pteriidae tribe.
• **Chiton** (Coat of mail shell) are small to large marine mollusca in the class-Polyplacophora formerly known as Amphineura.

76. Which one is the correct hierarchical order in Taxonomy?
(a) Genus < species < class < order
(b) Genus < class < order < family
(c) Species < order <class < phylum
(d) Genus < class < division < order

J&K CET-2015, 2009

Ans. (c) : Taxonomic hierarchy
• First used by Linnaeus
• Arrangement of taxonomic categories descending order from higher to lower in biological classification

Kingdom
↓
Phylum
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

77. Class is the category of taxonomy which includes related
(a) families (b) orders
(c) genus (d) species

J&K CET-2014

Ans. (b) : Class is the category includes related order. For example- - order primate comprising monkey, gorilla and gibbon is placed in class, Mammalia along with order Carnivora that includes animals like tiger, cat and dog.

78. The concept of "biological species" was proposed by
(a) Carolus Linnaeus (b) Darwin
(c) E. Mayr (d) Von Baer

AMU -2000

Ans. (c) : The concept of 'biological species' was proposed by 'Earnst Mayr'. It was groups of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups.
• This theory explain that organism distinct at a biological level do not interbreed with each other when budding in the same region.

79. Which of the following taxonomist described classification of plant kingdom in"Families flowering plants"?
(a) Cronquist (b) Takhtajan
(c) Benson (d) Hutchinson

MGIMS Wardha-2004

Ans. (d) : John Hutchinson an English botanist, proposed phylogenetic classification in his famous book ' families of flowering plants ' in 1959.
In Hutchinson's classification
(i) Tree and shrubs are considered to be more primitive than monocot herbs
(ii) Dicots have been considered more primitive than monocots.
(iii) Polypetalous, actinomorphic and solitary flowers are considered more primitive than gamopetalous zygomorphic and inflorescence respectively.

80. Which of the following taxonomic ranks contains organisms most similar to one another?
(a) Class (b) Genus
(c) Family (d) Species

UP CPMT-2001

Ans. (d) : A group of individual organism with fundamental similarities as a species. As we go higher taxonomic categories to tower taxonomic categories the common characters are increases like kingdom to species. In kingdom common characters are less similar than species. i.e. species have more similar characters.

81. Statement: Sub species has a geographical area and geographically isolated from other sub species.
Reason: When members of a species are geographically isolated they give rise to a sub species.
(a) both statement and reason are correct and the reason is the correct explanation to the statement
(b) reason is the correct explanation to the statement but the statement is not correct
(c) both statement and reason are not correct
(d) only statement is correct and reason is wrong

AP EAMCET-2004

Ans. (a) : Sub -species is a category in taxonomy that ranks below the species which include geographically isolated group of individual not all species have sub-species because when members of a species are geographically isolated then they give rise to a sub - species.

82. Taxonomically, which of the following set is matched correctly?
(a) Cattle fish, Jelly fish, Silver fish
(b) Bat, Pigeon, Kite
(c) Lobsters, Spider, Shrimps
(d) Oyster, Otter, Octopus

CG PMT-2009

Ans. (c) : All of these organisms belongs to members of phylum arthropod. This phylum is characterised by having a segmented body plan and an outer cuticle mode of chitin.

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83. Cladistics can be best defined as
(a) the relationship between sub-species and species
(b) relationship between two most forward races
(c) relationship between endangered and surviving species
(d) method of classification that attempt to interfere phylogenetic relationship

AMU-2006

Ans. (d) : Method of classification that attampt to interfere phylogenetic relationship is known as cladistics.
• It is also called phylogenetic system of classification that indicates the evolutionary or phylogenetic relationship of organism.
This classification was initiated by Engler & Prantl (1887-1899).
• In this system flowering plants are placed in ascending series related to complexity or floral morphology.

84. If a botanist has to nomenclate a similar species, he will use :
(a) isotype (b) mesotype
(c) neotype (d) syntype

JIPMER-2001

Ans. (a) : Isotype is the duplicate of holotype as another branches of the same tree.
For a similar species isotype is done of a plant as holotype which means (reference specimens)
• In this process a specimen is collected from the same plant at the same time and this duplicate specimen are often kept in several Institute. So if a botanist has to nomenclature a similar species he will use isotype.
• **Mesotype-** Specimen are not used for the study of similar species.
• **Neotype–** New nomenclature type when original type is missing.
• **Syntype–** Any specimens cited by author, when there is no holotype, was designated.

85. The word species was coined by
(a) Aristotle (b) Linnaeus
(c) John Ray (d) Engler

J&K CET-2015

Ans. (c) : The term species was coined by John Ray (1693). Species is basic unit of classification which include a group of organisms that can interbreed and produce fertile offspring's.

86. Which set of 'species' names belong to same genus?
(a) histolytica and coli
(b) gingivalis and protens
(c) protens and coli
(d) vivax and coli

JIPMER-1996
Haryana PMT-1999

Ans. (a) : Entamoeba histolytica (parasitic protozoans) and Entamoeba coli both belongs to same genus - Entamoeba which is a genus of parasitic protozoa.

87. A species is a collection of demies. The deme is a group of
(a) genes in different environment
(b) individuals in same environment
(c) chromosome in same organism
(d) population with a common gene pool

BHU PMT (Screening)-2011

Ans. (d) : Deme is a population of organisms within which the exchange of genes is completely random i.e. all mating combinations between individuals of opposite sexes have the same probability of occurrence.
• The deme usually is not a closed population but contribute individuals to neighboring populations & receives immigrants from them. The deme is an assemblage of closely related interbreeding individuals of a species that shores a continuous uninterrupted distribution.

88. Taxonomic hierarchy refers to
(a) stepwise arrangement of all categories for classification of plants and animal
(b) a group of senior taxonomists who decide the nomenclature of plants and animals
(c) a list of botanists or zoologists who have worked on taxonomy of a species or group
(d) classification of a species based on fossil record

Haryana PMT-2003
DUMET-2009,2011

Ans. (a) : Taxonomic hierarchy stepwise arrangement of all categories for classification of plants and animals.
In taxonomic hierarchy each category referred to as unit of classification infact, represents a rank and is commonly termed as taxon.

89. Principles and rules of classification are studied under :
(a) natural classification (b) systematics
(c) nomenclature (d) taxonomy

Haryana PMT-2003

Ans. (d) : The main objective of taxonomy are Identification, Nomenclature and Classification. Taxonomy is the branch of biology that involves the study of principle and rules of classification into groups based on similarities of structure, origin etc.

90. Which of the following taxonomical ranks contain organisms least similar to one another?
(a) Class (b) Genus
(c) Family (d) Species

CG PMT-2010
BCECE-2009
AP EAMCET-1997

Ans. (a) : The correct hierarchy of classification of various taxon is descending order in given by kingdom →Phylum→Class→Order→Family→ Genus →Species.
• Class taxonomic categories contains organism least similar to one another. It represents the organisms of related orders.
• Related order are kept in a class and related classes are kept in a phylum. The phylum, class and order are higher taxonomic categories identified on the basis of aggregate of character.

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91. Which of the following have more characters in common?

(a) Order (b) Family
(c) Class (d) Phylum

CG PMT-2011

Ans. (b) : As we move from species to kingdom, the number of common characters decreases so, more characters are found in family as per options.
• According to hierarchy level species has the more common characters.
Whereas kingdom has the least common characters.

92. Taxonomy is the branch of science which deals with

(a) identification (b) nomenclature
(c) classification (d) All of these

CMC Ludhiana -2013

Ans. (d) : Based on characteristics, all living organisms can be classified into different taxa. This process of classification is taxonomy.
Hence, characterization, identification, classification nomenclature are the basics of taxonomy.

93. Polytypic species are those which

(a) do not interbreed
(b) are distributed in different geographical areas
(c) have two or more species
(d) belong to different time periods

CMC Ludhiana-2015

Ans. (c) : Species are those which have two or more sub-species are called polytypic species while the species having no sub-species are called monotypic species. Example is tiger- *Panthera tigris* which have several subspecies ,such as (i) Indian tiger - *Panthera tigris tigris* (ii) Chinese tiger - *Pathera tigris amoyensis* (iii) Siberian tiger- *Panthera tigris sondaica* etc.

94. What is true for individuals of same species

(a) Live in same niche
(b) Live in same habitat
(c) Interbreeding
(d) Live in different habitat

AIPMT-2002

Ans. (c) : Species is lowest taxonomic categories.
Niche- Defined as the functional or maximum activity performed of any organism or individual.
Habitat- It is defined as an area of specific organism or type of a location of organism.

95. Mark the odd one.

(a) Family (b) Class
(c) Taxon (d) Phylum

Uttarakhand PMT-2011

Ans. (c) : Taxon– It is suggested as a group of one or more population of organism in taxonomical form.
Phylum– It is placing similar class together with similar characters.
Family– It is placing similar genus together with similar characters.
Class– It is placing similar order together with similar characters.

96. Choose the wrong statement with reference to subspecies

(a) They show minor variations from parent population
(b) They do not interbreed with individuals of other subspecies
(c) They are new species in the making
(d) Geographically isolated population of a species

AP EAMCET-2014

Ans. (b) : Species is the fundamental unit of classification recognized by the International commission of Zoological Nomenclature.
Subspecies is a category in biological classification that ranks below a species and usually a fairly permanent geographically isolated race.
e.g. – The dog (Canis lupus familiaris) and the dingo (Canis lupus dingo) are both subspecies of the wolf (Canis lupus).

97. Phenetic classification of organisms is based on:-

(a) The ancestral lineage of existing organisms
(b) Dendogram based on DNA characteristics
(c) Sexual characteristics
(d) Observable characteristics of existing organisms

AIPMT-2004

Ans. (d) : In biology, phenetics term is originated from greek word phainein. In greek word phainein means appear.
• Phenetic classification is done on the basis of observable characteristics of an existing organism. Here observable character refers to morphology and other trait that can observe.

98. In Whittaker's system of classification, prokaryotes belong to the kingdom

(a) Monera (b) Protista
(c) Animalia (d) Fungi

JIPMER-2010

Ans. (a) : R.H Whittaker give five kingdom system of classification. Whittaker divided all living organisms into five categories namely - Monera, Protista , Fungi, Plantae and Animalia.
• **Monera** include prokaryotic organisms. eg. E. coli, Salmonella etc.
• **Protista** include all unicellular eukaryotic organisms. eg. Euglena, Paramecium etc.
• **Fungi** include eukaryotic, non-vascular , non-motile and heterotrophic organisms like - Mucor, Agaricus, Rhizopus etc.
• **Animalia** include all multicellular eukaryotic organisms. It include members of phylum from porifera to chordata.
• **Plantae** include all multicellular eukaryotic organisms who can synthesize their food from sunlight including all plants.

99. A species with several subspecies is called a

(a) polytypic species (b) polytopic species
(c) superspecies (d) monotypic species.

AMU-1995

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Ans. (a) The species which have more than one subspecies called polytypic species.
• Those species which have only one subspecies called monotypic species.

100. In which kingdom would you classify the archaea and nitrogen-fixing organism, if the five-kingdom system of classification is used:
(a) Plantae (b) Fungi
(c) Protista (d) Monera

AIPMT-2003

Ans. (d): Five kingdom system was given by R.H. Whittaker in 1969. The names of kingdom are Monera, Protista, Fungi, Planate and Animalia. The kingdom Monera is divided into the Archaebacteria and the Eubacteria. The Archaebacteria group includes primitive prokaryotes and Eubacteria group includes the nitrogen -fixing bacterium. Both Archaea and nitrogen-fixing organisms are prokaryotic in nature.
Hence, they can be placed in the kingdom Monera.

101. In five kingdom system, the main basis of classification is: -
(a) Structure of nucleus
(b) Nutrition
(c) Structure of cell wall
(d) Asexual reproduction

AIPMT-2002

Ans. (b) : Five kingdom system proposed by R.H. Whittaker in 1969. Monera, protista, fungi, plantae and animalia. The main criteria for classification used by him include cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationships.

102. Species can be identified on the basis of
(a) interbreed
(b) species diversity
(c) reproductive isolation
(d) None of the above

JIPMER-2008

Ans. (c) : A species is a group of organisms that may interbreed and produce offspring that is also capable of reproducing the same kind. Species are the lowest rank of taxonomic hierarchy and it is considered as the basic unit of taxonomy. Species can be identified on the basis of reproductive isolation.

103. The taxon which includes related species is
(a) Class (b) Order
(c) Family (d) Genus

AIIMS-2010

Ans. (d) : Genus show additional characters in common in comparison to species of other genera. Genus includes a group of related species. In the other words, genera are aggregates of closely related species. Eg. : potato and brinjal are two different species but both belong to the genus Solanum.

104. Static concept of species was put forward by:
(a) De Candolle (b) Linnaeus
(c) Theophrastus (d) Darwin

AIPMT-1988

Ans. (b) : Static concept of species was put forward by Linnaeus. According to static concept of species there is no change in the species and they do not vary in size, shape, form etc.

105. Which of the following is not true for a species?
(a) Members of a species can interbreed
(b) Variations occurs among members of a species
(c) Each species is reproductively isolated from every other species
(d) Gene flow does not occur between the populations of a species

Uttarakhand PMT-2010

Ans. (d) : Gene flow does not occurs between the population of a species is wrong statement.
• Members of a species can interbreed to produce sexually capable offspring's
• Variation occurs among members of species is proved by law of genetics.
• Each species is reproductively isolated from every other species because individual of one species can interbreed to Individual of same species to produce fertile offspring's.

106. The biological concept of species was formulated by
(a) Mayr (b) Stebbins
(c) Heywood (d) Love

Punjab MET-2007

Ans. (a) : The biological concept of species was formulated by Mayr for group members of same species organism that can interbreed to produce fertile offspring .
• Mayr's biological concept of species is mainly based on reproductive isolation.

107. Identify the correct sequence of taxonomic hierarchial arrangement in ascending order of the following
(a) Spermatophyta, Sapindales, Dicotyledons, Anacardiaceae, Mangifera
(b) Mangifera, Dicotyledons, Anacardiaceae, Spermatophyta, Sapindales
(c) Mangifera, Anacardiaceae, Sapindales, Dicotyledons, Spermatophyta
(d) Dicotyledons, Anacardiaceae, Sapindales, Spermatophyta, Mangifera

AP EAMCET-2016

Ans. (c) : Mangifera, Anacardiaceae, Sapindales Dicotyledons, Spermatophyta. The correct sequence of taxonomic hierarchial arrangement in ascending order are as follows-

Genus→	Family→	Order→	Class→	Division
⇓	⇓	⇓	⇓	⇓
Mangifera	Anacardiaceae	Sapindales	Dicotyledons	Spermatophyta

108. Select the wrong statements :
A. Lower the taxon, more are the characteristics that the members within the taxon share.
B. Order is the assemblage of genera which exhibit a few similar characters.
C. Cat and dog are included in the same family Felidae
D. Binomial nomenclature was introduced by Carolus Linnaeus.

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(a) A, B and C only (b) B ,C and D only
(c) A and D only (d) C and D only
(e) B and C only

Kerala PMT-2011

Ans. (e) : In taxonomy the order is assemblage of family which show similar characters while similar characters are less in number as compared to different genera included in family.
• Cat and dog are included in different family because Cat belong to family Felidae while Dog belong to family Canidae.
Hence, option (b) and (c) both are wrong statements.

109. Identify the correct sequence of taxa in Linnaeus hierarchy:
(a) Species, genus, family, order, class
(b) Class, family, species, genus, order
(c) Species, genus, phylum, family, class
(d) Phylum, class, family, species, order

Karnataka CET-2001

Ans. (a) : Taxonomy is the science of classifying organisms. Taxa are the range from kingdom to species. According to Linnaeus the sequence of taxa are as follow → species → Genus → family → Order → Class→ Phylum → Kingdom.
Hence, option (a) is correct.

110. A species defined as "the group of actually or potentially inter-breeding natural population producing fertile offspring and reproductive isolated from other groups" The above statement is given by
(a) Carolus Linnaeus (b) Mayr
(c) J.B. Lamarck (d) Charles Darwin

CG PMT-2005

Ans. (b) : Mayr's biological concept of species is mainly based on reproductive isolation.
According to Mayr the species is the group of actually or potentially inter-breeding natural population producing fertile offspring and reproductive isolated from other groups .

111. Which is highest in the hierarchy of taxonomic category?
(a) Genus (b) Family
(c) Order (d) Class

BCECE-2015

Ans. (d) : The hierarchial order for any organism are as follows - Class is highest in the hierarchy of taxonomic category for the given question.

Kingdom
↓
Phylum
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

112. Which taxonomic term may be suggested for any rank in the classification?
(a) Class (b) Order
(c) Species (d) Taxon

Karnataka CET-2013

Ans. (d) : According to definition of taxon "It is as a collection of one or more population of organisms".
A particular level of hierarchy in the classification of living beings is known as Taxon.

113. Which of the following is the largest taxon among plants in terms of the number of species?
(a) Algae (b) Mosses
(c) Ferns (d) Fungi

AMU-2014

Ans. (d) : Among the above option fungi is the largest taxon among plants in terms of the number of species algae 5%, mosses 5%, fern 8% but fungi have 82%. Hence option 'd' is correct

114. A group of individuals, which are able to breed among themselves and produce their own kind, is known as
(a) genus (b) species
(c) family (d) order

J&K CET-2010

Ans. (b) : A group of individuals, which are able to breed among themselves and produce their own kind is known as species eg.- sapiens is species name of Human as- *Homo sapiens* , tigrina is species name of frog as *Rana tigrina*, domestica is species name of Housefly as *Musca domestica* etc.

115. Humans belong to the family
(a) Hominidae (b) Pongidae
(c) Hylobatidae (d) Ramapithecus

J&K CET-2010

Ans. (a) : Taxonomic status of Human are as follows-
Kingdom - Animalia
Phylum - Chordata
Class - Mammalia
Order - Primata
Family - Hominidae
Genus - Homo
Species - sapiens

116. The biological definition of a species depends on
(a) The geographical distribution of two groups of organisms
(b) Reproductive isolation of two groups of organisms
(c) Anatomical and development differences between the two groups of organisms
(d) Difference in the adaptation of two groups of organisms

BCECE-2012

Ans. (b) : According to concept of species it is a group of closely related organisms that are very similar to each other and usually capable of interbreeding and producing fertile offspring. Reproductive isolation refers to the inability of relative species to breed.

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117. The framework system of classification in which various taxonomic categories are arranged in order of logical sequence is called

(a) Systematics (b) Classification
(c) Hierarchy (d) Taxon

J&K CET-2011

Ans. (c) : Hierarchy is the framework system of classification in which various taxonomic categories are arranged in order.

• Hierarchy was introduced by Linnaeus. The sequence of taxa in hierarchy are as follows-

Domain
↓
Kingdom
↓
Phylum /Divison
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

118. Which one of the following shows, the hierarchical arrangement of taxonomic categories of plants in ascending order?

(a)	(b)	(c)	(d)	(e)
Kingdom	Kingdom	Kingdom	Kingdom	Kingdom
↑	↑	↑	↑	↑
Division	Division	Division	Division	Division
↑	↑	↑	↑	↑
Class	Order	Order	Class	Family
↑	↑	↑	↑	↑
Order	Class	Class	Order	Order
↑	↑	↑	↑	↑
Family	Family	Family	Family	Class
↑	↑	↑	↑	↑
Species	Genus	Genus	Genus	Genus
↑	↑	↑	↑	↑
Genus	Species	Species	Species	Species

Kerala PMT-2014

Ans. (d) : The hierarchical arrangement of taxonomic categories of plants in ascending order are as follows

Kingdom
↑
Division
↑
Class
↑
Order
↑
Family
↑
Genus
↑
Species

119. Match the following and choose the correct combination from the options given.

Column-I (Common Name)		Column –II (Taxonomic Category-Family)	
A.	**Man**	**1.**	**Poaceae**
B.	**Datura**	**2.**	**Anacardiaceae**
C.	**Mango**	**3.**	**Solanaceae**
D.	**Wheat**	**4.**	**Hominidae**

(a) a – 4, b –3, c – 2, d – 1
(b) a – 4, b –3, c – 1, d – 2
(c) a – 1, b –2, c – 3, d – 4
(d) a – 1, b –3, c – 2, d – 4
(e) a – 3, b –4, c – 1, d – 2

Kerala PMT-2013

Ans. (a) :

	(Common name)	(Taxonomic category - family)
a.	Man	Hominidae
b.	Datura	Solanaceae
c.	Mango	Anacardiaceae
d.	Wheat	Poaceae

120. Organisms who are able to freely interbreed producing fertile offsprings and having similar blue print for making these organisms are referred to as:

(a) species (b) tribe
(c) genus (d) sub-genus

JIPMER-2015

Ans. (a) : Species represent a group of organisms. The organisms of the species can reproduce independently among themselves, and can produce fertile offspring and have a similar genetic composition.

121. Which organization publishes the Red Data Book?

(a) GEF (b) IUCN
(c) UNEP (d) WWF

NEET (Karnataka)-2013

Ans. (b) : The International Union for Conservation of Nature and Natural Resource. Publishes the Red list of threatened species, also known as the IUCN Red list or Red data book, founded in 1964 is the world's most comprehensive inventory of the global conservation status of biological species.

• Red data book is the document established by IUCN for documenting the rare and endangered species of plant, animals, fungi and also a few local species that exist within a state or country.

122. The common characteristics between tomato and potato will be maximum at the level of their

(a) Genus (b) Family
(c) Order (d) Division

NEET (Karnataka)-2013

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Ans. (b) : Potato (*Solanum tuberosum*) and tomato (*Lycopersicum esculentum*) both belong to family solanaceae.
The common characteristics between tomato and potato will be maximum at the level of their family.

123. Which arrangement is in correct ascending order
(a) Species < genus < order < family
(b) Genus < species < family < order
(c) Order < family < genus < species
(d) Species < genus < family < order

AIPMT-1999

Ans. (d) : Taxonomic hierarchy refers to the sequence of taxonomic categories in definite order from higher to lower or lower to higher.
Kingdom is the highest rank and species is the lowest rank.
Correct sequence in ascending order is species, genus, family, order, class, phylum or division kingdom.

124. Practical purpose of taxonomy or classification
(a) Facilitate the identification of unknown species
(b) Explain the origin of organisms
(c) To know the evolutionary history
(d) Identification of medicinal plants

AIPMT-1999

Ans. (a) : Taxonomy help to identify the unknown species. Taxonomy is based on the classification of living organism is to facilitate identification.
Taxonomy is the science of classification of organism and include identification and nomenclature based on the description of characteristics.

125. Which of the following less general in characters as compared to genus : -
(a) Species (b) Division
(c) Class (d) Family

BHU PMT (Screening)-2010
AIPMT-2001

Ans. (a) : There are seven obligate categories-kingdom, division, class, order, family, genus and species.
- When we go higher from species to kingdom, the number of common characteristics goes on decreasing.
- Species are the smallest group among all the seven levels of taxonomy with almost similar characters.

Example: Cat *: Felis catus* etc. 'Species' is less general in characters as compared to genus.

126. Which one of the following expanded forms of the following acronyms is correct ?
(a) IUCN = International Union for Conservation of Nature and Natural Resources
(b) IPCC = International Panel for Climate Change
(c) UNEP = United Nations Environmental Policy
(d) EPA = Environmental Pollution Agency

AIPMT (Screening)-2011

Ans. (a) : IUCN → International Union for Conservation of Nature and natural resources.
- It is international organization working in the field of nature conservation and sustainable use of natural resources. It is involved in data gathering and analysis, research field and education.
- IPCC ⇒ The Intergovernmental Panel on Climate Change.
- UNEP ⇒ United Nations Environmental Programme.
- EPA ⇒ Environmental Protection Agency.

127. Which one of the following animals is correctly matched with its particular named taxonomic category ?
(a) Housefly – Musca, an order
(b) Tiger – tigris, the species
(c) Cuttlefish – Mollusca, a class
(d) Humans – Primata, the family

AIPMT (Screening)-2011

Ans. (b) : According to the taxonomic hierarchy includes eight ranks from general classification to specific classification .
Which are; Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species.
- The zoological name of the tiger is *Panthera tigris tigris* being of the species classified under the genus Panthera.
  Other options – Cuttlefish belongs to class cephalopoda & phylum mollusca.
- Human belong to order primates and family Hominidae.
- Housefly is *Musca domestica,* it belongs to diptera order and musca is genus.

128. Statement (S) : Species are groups of potentially inter breeding natural populations that are isolated from other such groups.
Reason (R) : Reproductive isolation brings about distinctive morphological characters.
(a) Both statement and reason are true and reason is a correct explanation to statement
(b) Only statement is true and reason is a correct explanation to statement
(c) Both statement and reason are not true,
(d) Both statement and reason are true but reason is not the correct explanation to the statement

AP EAMCET-2005

Ans. (d) : Species are groups of interbreeding natural populations that are isolated from other groups of organisms. They belong to the same genus. Reproductive isolation or sympatric isolation brings about distinctive morphological characters.

129. Which of the following is not true for a species?
(a) Members of a species can interbreed
(b) Variations occur among members of species
(c) Each species is reproductively isolated from every other species
(d) Gene flow does not occur between the populations of a species

JIPMER-2014, 2007

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Ans. (d) : Gene flow is the movement of genetic material from one to another population. Gene flow can take place through migration between two population of same species and is mediated by reproduction and vertical transfer of gene from parent to offspring. There is gene transfer between a species population. Within plant species, gene flow may occurs when pollen is carried by bees or blown by wind from one flowering plant to another of same species.

130. Identify from the following, the only taxonomic category that has a real existence.

(a) Genus (b) Species
(c) Phylum (d) Kingdom

Karnataka CET-2006

Ans. (b) : The biological species concept is proposed by Ernst Mayr in which organisms that share common character and capable of interbreeding are called species. Term species was coined by John Ray. Species is the lowest taxon in hierarchy.

131. Assertion (A) :''The Biological Species'' concept helps us to ask how species are formed.
Reason (R) : The concept of biological species focuses our attention on the question of how reproductive isolation comes about.
The correct answer is

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are not true.
(c) Only (A) is true but (R) is not true
(d) Both (A) and (R) are correct and (R) is a not true explanation to (A)

AP EAMCET-2009

Ans. (a) : Species is a groups of actually or potentially inter breeding natural population which are reproductively isolated from other such group.

132. Assertion (A) : An ascending taxonomic sequence of *Gossypium herbaceum* indicates its placement in progressively higher groups.
Reason (R) : Ascending taxonomic hierarchy indicates that a taxon is treated as belonging to a number of taxa.
The correct answer is

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) Only (A) is true but (R) is not true
(d) (A) is not true but (R) is true

AP EAMCET-2009

Ans. (a) : *Gossypium herbaceum* (Cotton) belongs to family Malvaceae.

In taxonomic hierarchy various taxanomic categories are arranged in a proper descending order. The ascending taxonomic hierarchy shows that a taxon belongs to a number of taxa and its placement in progressively higher group.

133. The concept of genus was proposed by.

(a) John Ray (b) Tournefort
(c) Hooker (d) Bessey

AMU-2003

Ans. (b) : The concept of genus was proposed by Tournefort. But the terms like monocot, dicots, family and species was coined by John Ray.

134. Biological concept of species is mainly based on

(a) reproductive isolation
(b) morphological features only
(c) methods of reproduction only
(d) morphology and methods of reproduction

Uttarakhand PMT-2008

Ans. (a) : The Biological concept of species is based on the idea that a species is a group of organisms that can interbreed and produce viable fertile offspring. Reproductive isolation is considered as the primary factor in defining species boundaries with other factors such as morphology, and behaviors being secondary.

135. The type specimen used by the author in the original publication is known as :

(a) Lectotype (b) Isotype
(c) Holotype (d) Syntype

BVP-2006

Ans. (c) : The type specimen used by the author in the original publication is known as the holotype. The holotype is the single physical specimen eg- (a plant, animal or fossil) that is used to define and describe a new species and serve as the reference point for that species.

D. Taxonomical AIDS

136. Which taxonomic hierarchy contains organisms belonging to the same class but not to the same family?

(a) Genus
(b) Order
(c) Family
(d) Population

AP EAPCET-11.05.2023, Shift-I

Ans. (b) : Order being a higher category. It is the assemblage of families which exhibit a few similar character. In order organism belonging to the same class but not the same family.

137. Identify the Taxonomists from the group of scientists mentioned below :
Hugodevries, Endlicher, Frankel Konrat, Haeckel, de Candolle, Hanning

(a) Endlicher and de Candolle
(b) Hanning and Haeckel
(c) Frankel Konrat and Endlicher
(d) Hugodevries and Hanning

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : From the above scientist group Endlicher and de Candolle are taxonomists.

- Stephan Endlicher Austrian botanist who formulated a major system of plant classification.
- Term taxonomy was coined by A P de Candolle who was a swiss botanist.

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138. Which of the following are true about the taxonomical aid 'key'?

(A) Keys are based on the similarities and dissimilarities.

(B) Key is analytical in nature.

(C) Keys are based on the contrasting characters in pair called couplet.

(D) Same key can be used for all taxonomic categories.

(E) Each statement in the key is called Lead.

Choose the most appropriate answer from the options given below:

(a) (A), (B) and (C) only
(b) (B), (C) and (D) only
(c) (A), (B), (C) and (E) only
(d) (A), (C), (D) and (E) only

NEET (Re-Exam)-04.09.2022

Ans. (c) : Taxonomical aid keys are used for identifying plants and animals based on the similarities and dissimilarities. For identification purposes, separate taxonomic keys are required for each taxonomic category such as family, genus and species.

- Each statement in the key is called **lead**.
- The keys are based on the contrasting characters generally in a pair called **couplet**.

139. Read the following statements regarding biological museums

(i) Biological museums are generally set up in educational institutes such as schools and colleges

(ii) Museums have collections of preserved plant and animal specimens for study and reference

(iii) Specimens are preserved in the containers or jars in preservative solutions

(iv) Insects are preserved insect boxes after collecting, killing and paining

(v) Larger animals like birds and mammals are stuffed and preserved

(vi) Skeletons of mammals are not allowed to be kept in museums.

Which of the above statement is/are not correct?

(a) (ii) & (iii) only (b) (i) & (vi) only
(c) (v) only (d) (vi) only

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : For research and reference, museums have collections of preserved plant and animal species. The containers or jars contain preservation solutions that preserve the specimens. Insects are collected, killed and pinched before being kept in insect boxes. Larger creatures, such as birds and mammals are frequently preserved and stuffed. Animal skeleton collections are frequently found in museums.
Except statement (vi) all the given statements are correct regarding biological museums.

140. The taxonomical aid used for identification of organisms based both similarities and differences is

(a) Herbarium (b) Key
(c) Museum (d) Flora

AP EAMCET-25.09.2020 Shift-II
Kerala PMT-2012

Ans. (b) : Key is another taxonomical aid used for identification of plants and animals based on the similarities and dissimilarities.

•Keys are based on the contrasting character generally in a pair called couplet. Each statement in the key is called a lead. Keys are generally analytical in nature.

141. Assertion (A) : Herbariums are plant repositories which are used as reference specimens. Recently these are digitalized for global use.

Reason (R): Herbarium helps in the classification of plants and gives complete description about the taxonomy.

The correct answer is:

(a) Both (A) and (R) are true, (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Herbarium is a store house of collected plant specimens that are dried and pressed and finally preserved on sheets, known as herbarium sheet. They are arranged in according to a phylogenetic system of classification to give an idea about the evolution of families. Recently these are also digitalized for global access.

142. The contrasting characteristics generally in a pair used for identification of animals in Taxonomic Key are referred to as :

(a) Alternate (b) Lead
(c) Couplet (d) Doublet

NEET (Odisha)-2019

Ans. (c) : The contrasting characters in a key which are generally in a pair is called couplet. It represents the choice made between two opposite options, which results in acceptance of only one and rejection of the other. Each statement in the key is called a lead.

143. Lac is used in the manufacture of following products EXCEPT

(a) Toys (b) Polish
(c) Isinglass (d) Ink

MHT CET-2018

Ans. (c) : Lac and isinglass's are two different substance that obtained from different sources and used for different purposes. Lac is used in the manufacture of toy, polis, inks etc.

• The isinglass is product of fisheries i.e. used for centuries as a fining, or clearfying agent, in alcoholic beverages.

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144. Match the items given in Column I with those in Column II and select the correct option given below:

	Column I		Column II
(A)	**Herbarium**	**(i)**	**It is a place having a collection of preserved plants and animals**
(B)	**Key**	**(ii)**	**A list that enumerates methodically all the species found in an area with brief description aiding identification**
(C)	**Museum**	**(iii)**	**Is a place where dried and pressed plant specimens mounted on sheets are kept**
(D)	**Catalogue**	**(iv)**	**A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.**

	A	B	C	D
(a)	(i)	(iv)	(iii)	(ii)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(ii)	(iv)	(iii)	(i)

NEET-2018

Ans. (c) :

(A)	Herbarium	Is a place where dried and pressed plant specimens mounted on sheets are kept
(B)	Key	A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.
(C)	Museum	It is a place having a collection of preserved plants and animals
(D)	Catalogue	A list that enumerates methodically all the species found in an area with brief description aiding identification

145. Assertion (A): Species is the lowest taxonomic category in the hierarchical arrangement and shows distinguishing characters from one species from other closely related species based on several phenotypic characters. However, as we go higher from species to kingdom the number of common characters goes on decreasing.
Reason (R): All plants come under the highest category called kingdom, plantae, which has two major classes dicotyledonae and monocotyledonae.
Which of the following is true?
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) (A) is true, but (R) is false
(c) (A) and (R) are false
(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : In the assertion there are discussion of various aspect of species but Reason discuss about major category of plant. However, both assertion and reason are separately correct but they discuss about separate aspects. So, reason is not the correct explanation of Assertion.

146. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
(a) Monographs (b) Flora
(c) Both (a) and (b) (d) None of these

JIPMER-2017

Ans. (c) : The taxonomic keys are used in preparation of both monographs and flora.
Monograph have detailed information of one taxon that may be family, genus, order, class, kingdom, species, etc.- while flora represents the naturally occurring plants in a particular time or region.

147. Scientific names of plants are based on principles criteria agreed by and are given in
(a) IUCN (b) ICZN
(c) ICBN (d) ICPN

J&K CET-2014

Ans. (c) : The naming of plants are according to the rule of ICBN after its establishment. The ICBN only deals and control to the naming of plants but does not do any work on taxonomy. It has three departments. Namely, principles, rules and provisions for the governance of the code.
ICBN- International Code for Botanical Nomenclature.
IUCN- International Union for Conservation of Nature and Natural resources. It is an international organisation working in the field of nature Conservation and sustainable use of natural resources.
ICZN-International Code of Zoological Nomenclature.
ICPN– International Certificate in Pediatric Nutrition.

148. Who is regarded as the Father of Taxonomy?
(a) John Ray (b) Carolus Linnaeus
(c) AP de Candolle (d) Charles Darwin

WB JEE-2012
Rajasthan PMT-1995

Ans. (b) : Carolus Linnaeus- Father of taxonomy
• John Ray- Coined the term "species".
• AP de Candolle- coined the term "Taxonomy "
• Charles Darwin- Theory of Biological evolution by natural selection.

149. Herbarium sheets are arranged according to the system of classification and should have information about
(a) time and place of collection, English, local and botanical names, phylum, collectors name
(b) date and time of collection, English, local and botanical names, class, collectors name

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(c) date and place of collection, English, local and botanical names, order, collectors name
(d) date and place of collection, English, local and botanical names, family, collectors name

J&K CET-2014

Ans. (d) : Herbarium sheets are arranged according to the system of classification and should have information about- Date and place of Collection, English, Local and botanical name, family, Collectors name.

150. Study the following statements regarding to the preparation of herbarium sheets. (I) Plants should be collected in flowering stage. (II) Every detail regarding the plant such as locality, ecological conditions vegetative and floral characters, etc should be noted. (III) Plants are evenly pressed by unfolding all the plants parts between blotting papers (or newspapers) with the help of plant presser. (IV) Blotting paper need not to be changed until plants get dried. (V) After drying, the plants specimen is carefully mounted/pasted on the herbarium sheets. (VI) The herbarium sheet is labelled on the lower right hand corner representing the number of plant specimen, date of collection, etc. Which of the above statement (s) is not correct?

(a) Only I (b) Only IV
(c) I and IV (d) III and IV

Manipal-2015

Ans. (b) : Herbarium is a store house of collected plant specimens that are dried, pressed and preserved on sheets. The herbarium sheets also carry a label founding information about date and place of Collection English, local and botanical names, family, Collectors name. Herbarium also serves as quick referral system in taxonomical studies.

151. Study of preservation of dead organism in liquid by chemical method is called:

(a) Dermatology (b) Urobiology
(c) Chondrobiology (d) Cryobiology

JIPMER-1995

Ans. (b) : Study of preservation of dead organism in liquid by chemical method is called - Urobiology.
Study of skin - Dermatology
The study of the effects of freezing and low temperature on living organism →Cryobiology
Study of Cartilage → Chondrobiology.

152. The Imperial Forest Research Institute (IFRI) established in 1906 changed its name to

(a) IARI (b) FRI
(c) CDRI (d) CSIR

CMC Ludhiana-2014

Ans. (b) : The Imperial Forest Research institute (IFRI) established in 1906 changed its name to FRI. It is now known as the forest research institute, and it is a leading forestry research institution in India. It is part of the Indian council of forestry research and education.
Forest Research Institute and taught the forest system known as scientific forestry.

153. What is the correct sequence of Man, taxonomically starting from super-family to sub-family ?

(a) Hominoidea, Hominidae, Homininae
(b) Homininae, Hominoidea, Hominidae
(c) Hominidae, Homininae, Hominoidea
(d) Hominoidea, Homininae, Hominidae

TS EAMCET-2015

Ans. (a) : The taxonomic position of man is as follow-
Order - Primates
Suborder - Antheropidea
Super family - Hominoidea
Family - Hominidae
Sub family - Homininae

- Hominoidea is a branch of old world tall-less simians which is native to Africa and Southeast Asia.
- Group members of Hominidae are known as great apes.
- Homininae is a subfamily of Hominidae which includes, gorillas, chimpanzees and humans.

154. Which one of the taxonomic aids can give comprehensive account of complete compiled information of any genus or family at a particular time ?

(a) Taxonomic Key (b) Flora
(c) Herbarium (d) Monograph
(e) Dictionary

Kerala PMT-2009

Ans. (d) : A monograph provides a detailed written study of the organism. It is a comprehensive taxonomic aid of a taxonomic group, generally a genus or a family, providing all taxonomic data relating to group.

- **Herbarium-** Herbarium is a store house of collected plant specimens that are dried, pressed and preserved an sheets. These sheets are arranged according to a universally accepted system of classification.
- **Key-** Key is another taxonomical aid used for identification of plants and animals based on the similarities and dissimilarities.

155. The label of a herbarium sheet does not carry information on

(a) date of collection (b) name of collector
(c) local names (d) height of the plant

NEET-2016 Phase-II

Ans. (d) : It is a collection of preserved plant specimens that are organized, labeled and stored in a way that makes them easier to find. You can consider it a library of dried plant which is utilized for both schooling and exploration. It does not carry information on plant height. When specimens are collected in the field, the herbarium and associated information in the library are used to identify the specimens, to determine how one species differs from another, or whether a specimen represents a species new to science.

156. Which one of the following is not a correct statements?

(a) Key is taxonomic aid for identification of specimens
(b) Herbarium houses dried, pressed and preserved plant specimens

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(c) Botanical gardens have collection of living plants for reference
(d) A museum has collection of photographs of plants and animals

NEET-2013

Ans. (d) : Museums have collections of preserved plant and animal specimens for study and reference. Specimens are preserved in the containers or Jars in preservative solutions. Plant and animal specimens may also be preserved as dry specimens. A museum has not collection of photographs of plants and animals. Key consists of a contrasting character called couplet.

157. One of the most important function of botanical gardens is that–
(a) one can observe tropical plant there
(b) they allow ex situ conservation of germplasm
(c) they provide the natural habitat for wildlife
(d) they provide a beautiful area for recreation

Uttarakhand PMT-2010
JIPMER-2007

Ans. (b) : Botanical garden function as ex-situ conservation of germplasm of different plants. It is a technique of conservation of biological diversity outside natural habitats.

158. The pesticide that is used in the preparation of herbarium is
(a) 2, 4 dichlorophenoxy acetic acid
(b) NAA
(c) mercuric chloride
(d) carbon disulphide

J&K CET-2010

Ans. (c) : The herbarium is the place where collection of dried plants parts are arranged in a systemic manner and where information about the plant printed. Mercuric chloride is a antifungal pesticides, and they are used in herbarium, after pasting the herbarium sheets the specimen gets sprayed.

159. A major break through in the studies of cells came with the development of electron microscope. This is because
(a) the resolution power of the electron microscope is much higher than that of the light microscope
(b) the resolving power of the electron microscope is 200 – 350 nm as compared to 0.1 – 0.2 nm for the light microscope
(c) electron beam can pass through thick materials, whereas light microscopy requires thin sections
(d) the electron microscope is more powerful than the light microscope as it uses a beam of electrons which has wavelength much longer than that of photons

BCECE-2013

Ans. (a) : A beam of electrons with a wavelength substantially greater than that of photons is used in an electron microscope.
The electron microscope has a higher magnification power than a light microscope.

160. Which of the following statement(s) about taxonomical aids is/are true?
I. Keys are used to identify plants and animals based on similarities and dissimilarities
II. Flora contains the account of habitat and distribution of plants in a given area
III. Flora provide an index to the plant species found in a particular area
IV. Monographs provide information for identifying the species found in an area
(a) I and II only (b) I, II and III only
(c) I and IV only (d) I only
(e) IV only

Kerala PMT-2014

Ans. (b) : Monographs contain information on any one taxon. It can not be used for identification purpose.
A monograph is a systematic detailed study of a particular organism or its taxonomic group.
Hence, correct statements are I, II, and III only.

161. A student wishes to study the cell structure under a light microscope having 10X eyepiece and 45X objective. He should illuminate the object by which one of the following colours of light so as to get the best possible resolution?
(a) Yellow (b) Green
(c) Blue (d) Red

JIPMER-2007

Ans. (c) : Wavelength of light is inversely proportional to the resolution power of microscope.

$$E \propto F \propto \frac{1}{\lambda} \propto R.P$$

$$\underrightarrow{VIBGYOR}$$

Red light $\Rightarrow$ Wavelength maximum, Resolution Power minimum.
Violet light $\Rightarrow$ Wavelength minimum, Resolution Power maximum.

162. A collection of plants and seeds having diverse alleles of all the genes of a crop is called :
(a) Genome (b) Herbarium
(c) Germplasm (d) Gene library

AIPMT (Screening)-2011

Ans. (c) : The entire collection of plants/seed having all the diverse alleles for all the genes in a given crop is called germplasm collection.

- A herbarium is a museum of preserved plants for botanical research, mainly in identification and classification of plants. Ex- Royal Botanical Garden (England).
- Gene library is a large collection of DNA fragment cloned from given organism, tissue, organ and cell type.
- The genome is the entire set of DNA instructions found in a cell.

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163. Match the following lists

List-I		List-II	
A.	**Pollen basket**	**1.**	**Butterfly**
B.	**Pseudotracheae**	**2.**	***Laccifer lacca***
C.	**Shellac**	**3.**	**Mosquito**
D.	**Dutton's membrane**	**4.**	**Musca**
E.	**Well developed galea**	**5.**	**Worker bee**

The correct set is

	A	B	C	D	E
(a)	5	4	2	3	1
(b)	4	5	3	2	1
(c)	1	5	3	4	2
(d)	3	2	4	5	1

AP EAMCET-2008

Ans. (a) : The tibia of hind legs of the worker bee carry a special apparatus called pollen basket or corbiculae.

- Housefly genus Musca have food channels on the surface of labella. These are called pseudotracheae.
- Shellac is bleached lac which is melted and moulded into rods, flakes or sheets. Lac are the products of *Laccifer lacca*.
- Dutton's membrane is a covering in the area between mosquito extended tongue and base of lamellae.
- Well developed galea is present in the butterfly.

164. Science, which deals with the study of ageing is knows as

(a) Teratology (b) Gerontology
(c) Limnology (d) Palaeontology

CG PMT-2009

Ans. (b) : Science which deals with the study of ageing is known as **Gerontology**. It is concerned with the physiological, psychological and social changes that occurs in individuals as the age increases and the impact of these changes on their overall health and well being.

Paleontology — The study of fossils.

Teratology — The study of abnormal fetal development.

Limnology — The study of inland aquatic ecosystems.

165. The study of relationship between size and shape is called

(a) allopatric (b) allelopathy
(c) allometry (d) allogamy

Uttarakhand PMT-2008

Ans. (c) : Allometry is the study of the relationship between the size of an organism or one of its parts and some other trait or charactersties such as metabolic rate, growth rate.

Allopatric — Occurring in different geographic areas or in isolation.

Allelopathy — The suppression of growth of one plant species by another due to the release of toxic substances.

Allogamy— Reproducing by cross fertilization.

166. Which national institute encourages the publication of flora of different regions of India?

(a) IARI (b) NBRI
(c) BSI (d) FRI

AP EAMCET-2001

Ans. (c) : B.S.I (Botanical Survey of India) is the national institute responsible for promoting the study conservation and sustainable utilization of India's flora. It was established in 1890 and operate under ministry of environment and Forest and Climate change, Government of India.

IARI — Indian Agriculture Research Institute. It is situated in New Delhi.

NBRI — National Botanical research institute. It is situated in Lucknow.

FRI — Forest Research Institute. It is situated in Dehradun, Uttrakhand.

167. Which one is a vital stain?

(a) methylene blue (b) janus green
(c) neutral red (d) All of these

Haryana PMT-2011

Ans. (d) : Vital stains is a technique in which stain are used on living cells without killing them.

Methylene blue, Janus green and neutral red are all examples of vital stain.

(i) Methylene blue- stain for nuclei of cells

(ii) Janus green stain living cells, particularly the mitochondria of cell.

(iii) Neutral red - It can be used for staining of nerve cell for microscopy and detection of viable cells in tissue culture.

168. Study the following lists.

List-I	List-II
(A) Training in landscaping	**1. BSI**
(B) Establishment of Mycological herbarium	**2. CIMAP**
(C) Research on paper pulp	**3. FRI**
(D) Introduction of Salvia into India	**4. IARI**
	5. NBRI

	A	B	C	D
(a)	3	1	4	5
(b)	5	4	1	3
(c)	5	3	1	4
(d)	5	4	3	2

AP EAMCET-2010, 2008

Ans. (d) :
1. BSI - Practice and Specification cover management and technical subject.
2. CIMAP - Introduction of Salvia into India.
3. FRI - Research on paper pulp.
4. IARI - Establishment of Mycological herbarium.
5. NBRI - Training in Landscaping.

169. Who invented electron microscope?

(a) Janssen (b) Edison
(c) Knoll and Ruska (d) Landsteiner

AIIMS-2010
DUMET-2002
Rajasthan PMT-2001

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Ans. (c) : The first prototype of the electron microscope was invented by **Ernst Ruska** a physicist and the **Max Knoll (1932)**.

- It was efficient to magnify up to four hundred power magnification and was the first apparatus to demonstrate principles of electron microscopy practically.
- The magnification of an electron microscope is more than 10,000 greater than that of a light microscope.

170. The international unit used in biology to measure size of objects is

(a) μ m (micrometer) (b) nm (nanometer)
(c) Å (angstrom) (d) All are used

CMC Vellore-2012

Ans. (b) : The international unit used in biology to measure the size of objects is the metric system. The basic unit is the meter, other unit of length that are some time used in biology nanometers, picometers, angstrom - which are even smaller unit of measurement.

171. The crystal of lead zirconate is a key component of

(a) Sonography
(b) Electrocardiography
(c) Electroencephalography
(d) Magnetoencephalography

WB JEE-2007

Ans. (a) : The crystal of lead zerconate is key component in medical ultrasound imaging, which is a type of diagnostic imaging technique that uses high frequency sound waves to create image of internal organs and tissue in the body is called sonography.
Electrocardiography – The process of producing an electrocardiogram, a recording of the heart's electrical activity through repeated cardiac cycle.
Electroencephalography – It is a test of measures the magnetic fields your brain's electrical current produce.

172. What kind of microscopy uses acridine orange?

(a) Phase contrast
(b) Fluorescence
(c) Transmission microscope
(d) Scanning electron microscope

BCECE-2015

Ans. (b) : Acridine orange is a Fluorescence dye that can be used in various type of microscopy, including fluorescence microscope and confocal microscopy.

173. The following is generally used for creating density gradient during centrifugation:

(a) NaCl (b) KCl
(c) CsCl (d) $MgCl_2$

BCECE-2015

Ans. (c) : Cesium chloride (CsCl) is commonly used for creating density gradient during centrifugation. CsCl are often used in biochemistry and molecular biology to isolate and purify nucleic acid, such as DNA and RNA based on their buoyant density.

174. The biggest herbarium of India is situated in:

(a) Dehradun (b) Lucknow
(c) Delhi (d) Calcutta

Rajasthan PMT-1996, 1995

Ans. (d) : The biggest herbarium of India is situated in Calcutta and is known as Botanical Survey of India. (BSI). It is one of the oldest institution in the world that deals with the study of plants and thus classification.

E. Binomial Nomenclature

175. Binomial system of nomenclature was given by

(a) Linnaeus (b) Theophrastus
(c) Hooker (d) Bentham

Karnataka CET-2022
Tripura JEE-2021, 2017
AP EAMCET-05.10.2021 Shift-I
MHT CET 5.10.2020 Shift-I
VMMC-2012
UP CPMT-2012, 2008
AFMC-2010
CMC Vellore-2010
J&K CET-2010, 2000
AMU-2009, 2003
Rajasthan PMT-2008, 2003, 1998
Punjab MET-2008, 1999
BHU-PMT (Screening)-2008, 2006
MGIMS Wardha-2008
CG PMT-2008
DUMET-2004
Manipal-2002
AIIMS-2000

Ans. (a) : Binomial system of nomenclature was given by Carolus Linnaeus.
According to Binomial nomenclature system each organism has a name with two components (i) the Generic name (ii) the specific epithet. This system providing a name with two components is called Binomial nomenclature.

176. The usage of binomial names, for plant species, was accepted by all after the publication of the works by:

(a) Hooker (b) Linnaeus
(c) Bentham (d) Darwin

MGIMS Wardha-2010
CMC Vellore-2008
WB JEE-2006
AMU-2006
AP EAMCET-1997

Ans. (b) : A swedish naturalist Carolus Linnaeus for the first time introduced the hierarchy system both in plants and animals. He wrote a book, **Systema Naturae**, (1735) in 12 editions. He propagated "binomial nomenclature" for all species in 10th edition of his book Published in 1758.
• Therefore the book - **" Systema Naturae"** is known as the dictionary of Classification and Linnaeus as father of binomial nomenclature and founder of Modern taxonomy.

177. ICBN stands for :

(a) Indian Code of Botanical Nomenclature
(b) Indian Congress of Biological Names
(c) International Code for Botanical Nomenclature
(d) International Congress of Biological Names

AMU-2014
AIPMT-2007
BVP-2004
DUMET-2003

@apna_pdf

Ans. (c) : The International Code for Botanical Nomenclature (ICBN) is a set of rules and recommendations dealing with the formal botanical names given to plant. The foundations of ICBN are given in book written by C. Linnaeus named **"Philosophia Botanica".**

178. Match the following plants with their Botanical names

Column-I		Column-II	
A.	Meadow Saffron	1.	Yucca gloriosa
B.	Red Dragon	2.	Smilax zeylanica
C.	Sarasaparilla	3.	Dracaena anguistifolia
D.	Spanish Dagger	4.	Colchicum autumnale

(a) A-2, B-3, C-4, D-1
(b) A-2, B-1, C-3, D-4
(c) A-4, B-3, C-2, D-1
(d) A-4, B-2, C-1, D-3

AP EAPCET-11.05.2023, Shift-II

Ans. (c) :
Meadow Saffron – *Colchicum autumnale*
Red Dragon – *Dracaena anguistifolia*
Sarasaparilla – *Smilax zeylanica*
Spanish Dagger – *Yucca gloriosa*

179. 'X' and 'Y' are the components of Binomial nomenclature. This naming system was proposed by 'Z':

(a) X-Specific epithet, Y-Generic name, Z-Carolus Linnaeus
(b) X-Generic name, Y-Specific epithet, Z-R.H. Whittaker
(c) X-Generic name, Y-Specific epithet, Z-Carolus Linnaeus
(d) X-Specific epithet, Y-Generic name, Z-R.H. Whittaker

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : The system binomial nomenclature is given by Carolus Linnaeus. Every organism is given a scientific name that consists of two components. The first word belongs to generic name and second word is known as the specific epithet.
■ So, the correct answer is X- Generic name, Y – specific epithet, Z- Carolus Linnaeus.

180. Identify the wrong statement regarding ICBN

(a) Scientific names of plants should be printed in Italics
(b) The first word represents the genus and second word represents species
(c) When hand written, scientific names are separately underlined
(d) Genus names starts with small letter and species name starts with capital letter

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : ICBN stands for International Code of Botanical Nomenclature.
ICBN is the collection of rules of scientific nomenclature of plant and was first proposed by Sprague, Hitchcock, Green (1930) but was accepted in 1961.
According to ICBN, biological name consists of two word Genus names starts with capital letter and species names start with small letter.
• Hand written scientific name are separately underlined.

181. Assertion (A): Naja naja is a tautonym.
Reason (R) : Animals in which generic name and species name are the same.
The correct option among the following is

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-30.07.2022 Shift-II

Ans. (a) : The scientific name of species in which both parts of the genus and species name containing a similar spelling is known as tautonym.
• In tautonym both genus and species name have same spelling.
• Eg - Naja naja (for king cobra/nag)
• Gulo gulo (for wolverine)
• Alces alces (for moose)
• Vulpes vulpes (for red fox)

182. ICZN is ————

(a) International centre of Zoological Nomenclature
(b) International code of Zygote Nomenclature
(c) International code of Zoological Nomenclature
(d) International centre of Zygote Nomenclature

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : ICZN stands for International Code of Zoological nomenclature (ICZN).
It ensures that scientific name assigned to any animal has only one name and will be recognized by that name all over the world. The headquarters of ICZN is situated at Singapore.

183. The third name in trinomial nomenclature is_____

(a) Subgenus (b) Species
(c) Ecotype (d) Sub species

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : The third name in trinomial nomenclature is known as - sub species.
• In trinomial nomenclature name completed in three part -
First part - genus
Second part - species
Third part - subspecies
Eg- Scientific name of Human in trinomial nomenclature is - *Homo sapiens sapiens* in which Homo belongs to genus and first sapiens denotes species and second sapiens denotes subspecies .

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184. In Binomial nomenclature, the name of the author _____.

(a) Is printed in the beginning of the biological name
(b) It is written in an abbreviated form
(c) Refers to that the genus was first described by him
(d) Printed in italics

AP EAMCET-25.09.2020 Shift-II

Ans. (b) : In Binomial nomenclature the name of the author is written in an abbreviated form at the end of the biological name. Eg. *Mangifera indica* Linn. It indicates that the species was first described by Linnaeus.

185. Match the following lists:

	List-I		List-II
A	Gaspard Bauhin	i	Crystallization of the enzyme urease
B	Sexual reproduction in plants	ii	Robert Hooke
C	J.B. Sumner	iii	Camerarius
D	Micrographia	iv	Introduced binomial nomenclature

The correct match is:

	(A)	(B)	(C)	(D)
(a)	iv	ii	iii	i
(b)	i	iii	iv	ii
(c)	iii	iv	ii	i
(d)	iv	iii	i	ii

TS EAMCET-09.05.2019 Shift-I

Ans. (d) :

	List - I	List - II
(A)	Gaspard Bauhin	Introduced binomial nomenclature
(B)	Sexual reproduction	Camerarius
(C)	J.B Sumner	Crystallization of the enzyme urease
(D)	Micrographia	Robert Hooke

186. Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus

(a) Mangifera indica Linn.
(b) Mangifera indica
(c) Mangifera indica
(d) Mangifera indica Car. Linn.

NEET-2019

Ans. (a) : According to rules of binomial nomenclature, the name of an organism contain a generic and specific name.
So the correctly written scientific name of mango is *Mangifera indica* Linn.

187. Which of the following is against the rules of ICBN?

(a) Generic and specific names should be written starting with small letters.
(b) Hand written scientific names should be underlined.
(c) Every species should have a generic name and a specific epithet.
(d) Scientific names are in Latin and should be italized.

NEET (Odisha)-2019

Ans. (a) : ICBN wrote the important rules and guidelines for scientific names –

- All the scientific names of organisms are usually latin hence, they are written in italics
- The scientific name exist two parts of a name. 1) Generic name 2) specific epithet.
- When the names are handwritten, they are underlined or italized if typed. This is done to specify its Latin origin.
- The name of the genus starts with a capital letter and the name of the species starts with a small letter.

Ex- The scientific name of humans are presented as Homo sapiens. 'Homo' represents the genus name and 'sapiens' represents the species name.

188. Match the following lists :

List-I	List-II
(A) C.G.K. Ramanujam	(i) Historia plantarum
(B) Sutton and Boveri	(ii) palynology
(C) Theophrastus	(iii) sexual system of classification
(D) Carolus Von Linnaeus	(iv) sexual reproduction in plants
	(v) chromosome theory of inheritance

The correct answer is

	A	B	C	D
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(v)	(i)	(iv)
(c)	(ii)	(v)	(iii)	(i)
(d)	(ii)	(v)	(i)	(iii)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) :

	List – I	List - II
a.	C.G.K Ramanujan	Palynology
b.	Sutton and Boveri	Chromosome theory of inheritance
c.	Theophrastus	Historia plantarum
d.	Carolus Von Linnaeus	Sexual system of classification

189. Match the following species with their scientific name:

List -I		List-II	
(A)	The black buck	(i)	Ailurus ochraceus
(B)	Pygmy hog	(ii)	Antilope cervicapra
(C)	Kashmir stag	(iii)	Sus salvanius
(D)	Red Panda	(iv)	Cervus elaphus hanglu

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The correct answer is

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(iii)	(iv)	(i)
(c)	(iii)	(i)	(ii)	(iv)
(d)	(iv)	(iii)	(ii)	(i)

TS EAMCET-03.05.2018 Shift-I

Ans. (b) :

	List - I	List - II
(A)	The black buck	Antilope cervicapra
(B)	Pygmy hog	Sus salvanius
(C)	Kashmir stag	Cervus elaphus hanglu
(D)	Red Panda	Ailurus ochraceus

190. Match the following :

List–I		List–II	
(A)	**Gaspard Bauhin**	**I.**	**Bacterial cell**
(B)	**Robert Hooke**	**II.**	**Bionomial nomenclature**
(C)	**Anton Van Leeuwenhoek**	**III.**	**Sexual reproduction in plants**
(D)	**Camerarius**	**IV.**	**Micrographia**

The correct answer is

Options:

	(A)	(B)	(C)	(D)
(a)	II	IV	I	III
(b)	II	IV	III	I
(c)	II	I	IV	III
(d)	III	I	IV	II

AP EAMCET-28.04.2017 Shift-II

Ans. (a) : Gaspard Bauhin introduced a scientific binomial system of classification to both anatomy and botany. In 1665 Robert Hook published his most famous book micrographia.

Anton von Leeuwenhoek is father of microbiology . He discovered both protists and bacteria. The discovery of sexual reproduction in plants is usually credited to Camerarius.

191. Match the following lists

List - I	List - II
(A) Diptera	**(I) *Homo sapiens***
(B) Poales	**(II) *Mangifera indica***
(C) Sapindales	**(III) *Musca domestica***
(D) Primata	**(IV) *Triticum aestium***

	A	B	C	D
(a)	III	I	IV	II
(b)	II	III	I	IV
(c)	III	IV	II	I
(d)	IV	II	III	I

TS EAMCET-12.05.2017
JIPMER-2013

Ans. (c) :

List-I		List-II
(A) Diptera	-	*Musca domestica*
(B) Poales	-	*Triticum aestium*
(C) Sapindales	-	*Mangifera indica*
(D) Primata	-	*Homo sapiens*

192. The binomial system of nomenclature now followed universally, was first proposed by

(a) Aristotle (b) Carolus Linnaeus
(c) G. Simpson (d) E. Mayr

Tripura JEE-2017
AMU-1995

Ans. (b) : Swedish botanist Carl Linnaeus is regarded as father of taxonomy. Linnaeus developed a ranked system known as Linnaean taxonomy for categorizing living organism and also give binomial nomenclature for naming organism.

193. Tautonym is

(a) unscientific explanation of a phenomenon
(b) common name used as scientific name
(c) non-latinised name
(d) same name for genus and species

CMC Ludhiana-2012
Haryana PMT-2003

Ans. (d) : Tautonym is a Scientific name in which the same word is used for both genus and species. For example: Bison is the scientific name of American Bison. Here both the Generic name and specific name is Bison. Naja-naja is the famous example of tautonyms.

194. Which of the following is the scientific or botanical name of Asafoetida (Hing)?

(a) *Curcuma longa* (b) *Curcuma amada*
(c) *Alpinia galanga* (d) None of these

MGIMS Wardha-2013

Ans. (d) : Botanical name of Asafoetida (Hing)- *Ferula asafoetida* Linn.
(a) *Curcuma longa*- turmeric (Haldi)
(b) *Curcuma amada* - Ginger
(c) *Alpinia galanga*- Galangal (Thai ginger)

195. Which of the following statements regarding universal rules of nomenclature is wrong?

(a) The first word denoting the genus starts with a capital letter
(b) The first word in a biological name represents the genus
(c) Biological names are generally in Greek and written in italics
(d) Both the words in a biological name, were hand-written, are separately underlined

MGIMS Wardha-2013

Ans. (c) : Universal rule of nomenclature are as follow-
(i) Biological names are generally in latin and written in italics. They are latinised or derived from Latin irrespective of their origin.
(ii) The first word in a biological name represents, the genus while the second word denotes the specific epithet.
(iii) Both the words in a biological name, were handwritten are separately underlined or printed in italics to indicate their Latin origin.
(iv) The first word denoting the genus start with Capital letter while the specific epithet start with a small letter. It can be illustrated with the example of *Mangifera indica* (mango).

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196. The scientific name of Asian tiger mosquito
(a) *Aedes aegypti*
(b) *Aedes albopictus*
(c) *Aedes taeniorhynchus*
(d) *Aedes albolineatus*

WB JEE-2009

Ans. (b) : The Asian tiger mosquito *(Aedes albopictus)* is small black and white mosquito.
Aedes aegypti, the yellow fever mosquito is a mosquito that can spread dengue fever, chikungunya , zika fever, yellow fever viruses and other disease agents.

197. Scientific name of sunflower is
(a) *Hibiscus rosa sinensis*
(b) *Solanum nigrum*
(c) *Oryza sativa*
(d) *Helianthus annuus*

WB JEE-2009

Ans. (d) : Scientific or botanical name of Sunflower is - *Helianthus annuus*
Family → Compositae.
Hibiscus rosa sinensis- China rose
Family → Malvaceae
Solanum nigrum- Black berry nightshade
Family - Solanaceae

198. The zoological name of North Indian hare is
(a) *Oryctolagus cuniculus*
(b) *Lepus rufi caudatus*
(c) *Lepus nigricollis*
(d) *Sorex araneus*

UP CPMT-2004

Ans. (c) : The zoological name of North Indian hare is - *Lepus nigricollis*
(a) *Oryctolagus cuniculus*- European rabbit
(b) *Lepus rufi caudatus* is an incomplete scientific name.
(d) *Sorex araneus*- common shrew

199. Which is a social foresting species ?
(a) *Leucaena leucocephala*
(b) *Tectona grandis*
(c) *Mangifera indica*
(d) *Rosa indica*

Punjab MET-1999

Ans. (a) : *Leucaena leucocephala* (Sebabul) is a species that lives in social forests and serves a variety of purposes, such as producing green manure, biomass, food for people, and pulpwood for the paper industry.

200. Botanical name of Chili is:
(a) *Solanum melongena*
(b) *Lycopercicum esculentum*
(c) *Capsicum annuum*
(d) None of the above

Rajasthan PMT-1996

Ans. (c) : Botanical name of chili is - *Capsicum annuum*
Family - Solanaceae
Chillies belong to the flowering plants there are almost 27 species that have been identified under this genus each of the member are varied with respect to size, shape and colour.

201. The botanical name of cauliflower is
(a) Brassica oleracea var. capitata
(b) Brassica oleracea var. botrytis
(c) Brassica oleracea var. gongylodis
(d) Brassica oleracea

AMU -2000

Ans. (b) : The botanical name of cauliflower is Brassica oleracea var. botrytis and it belongs to the Family brassicaceae.

202. In zoological nomenclature the sub-species is represented by
(a) trinomen (b) binomen
(c) uninomen (d) none of these

AP EAMCET-2001
AMU-1999
JIPMER-1997

Ans. (a) : In zoological nomenclature the sub-species is represented by - trinomial nomenclature or trinomen.

203. Scientific name of king cobra is :
(a) *Naja naja* (b) *Bungarus caeruleus*
(c) *Naja hannah* (d) *Viper russelli*

J&K CET-2006

Ans. (c) : Scientific name of king cobra is - *Naja hannah* (*Ophiophagus hannah*) large venomous snake native to Asia.
- *Naja naja*-Indian cobra
- *Bungarus caeruleus* - common krait
- *Viper russelli*- viper

204. Zoological name of common Indian krait is
(a) *Bungarus caeruleus*
(b) *Ophiophagus hannah*
(c) *Viper russelli*
(d) *Naja naja*

AMU-2009
Punjab MET-2008

Ans. (a) : Zoological name of Common Indian Krait- *Bungarus caeruleus*
- *Ophiophagus hannah* (king cobra)
-*Naja naja* (Indian cobra)
- *Viper russelli* (viper).

205. The generic epithet for the species epithet 'Santalinus' is:
(a) Abrus (b) Pongamia
(c) Pterocarpus (d) Cassia

AP EAMCET-1997

Ans. (c) : The first word in the Scientific name is the generic name (represent the genus) and Second word is the specific epithet (represent species name)
Pterocarpus santalinus - Red Sandal wood.

206. Indian rose wood tree is a common name of
(a) Acacia (b) Shorea
(c) Dalbergia (d) Eucalyptus

Uttarakhand PMT-2008

Ans. (c) : Indian rose wood is common name of - *Dalbergia latifolia* (Sisso). Eucalyptus is tallest angiosperms (over 100 meters).

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207. One of the recently introduced new crop of oil seed in the deserts of India is Jojoba . Select the correct botanical name of this plant

(a) *Simmondsia chinensis*
(b) *Lencaena leucophlala*
(c) *Dendroclamus*
(d) *Dendrobium javanica*

AMU-1996

Ans. (a) : *Simmondsia chinensis* - Jojoba commonly called goat nut, deer nut, pig nut, wild hazel, quinine nut, coffeeberry and gray box. Jojoba is grown commercially to produce jojoba oil, a liquid wax ester extracted from its seed.

208. Ragi is :

(a) *Eleusine coracana*
(b) *Hordeum vulgare*
(c) *Pennisetum typhodies*
(d) *Triticum aestivum*

BCECE-2003

Ans. (a) : Ragi (*Eleusine coracana*) is an important millet grown extensively in various region of India and Africa. Ragi is reach source of iron and other essential nutrients.

209. Botanical name of 'chana' is

(a) Cicer arietinum (b) Phaseolus aureus
(c) Lablab purpureus (d) Dolichos

JIPMER-2010

Ans. (a) : Botanical name of chana is *Cicer arietinum.*

- Chana also known as chickpea gram and Bengal gram.
- Chana is annual legume belong to the family Fabaceae.

It is classified as -
Kingdom - Planate
Division - Magnoliophyta
Class - Magnoliopsida
Order - Fabales
Family - Fabaceae
Genus - Cicer
Species - arietinum.

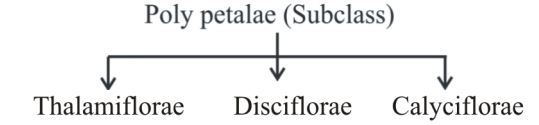
210. Thalamiflorae, Calyciflorae and Disciflorae are series of

(a) Polypetalae (b) Gamopetalae
(c) Monochlamydae (d) Monocots

Uttarakhand PMT-2011

Ans. (a) : Polypetalae , is a subclass in which the flowers contain non-essential whorls calyx and corolla.

- It is categorizes into three series namely - Thalamiflorae, Disciflorae and Calyciflorae.



211. The botanical name of soyabean is

(a) Cajanus cajan (b) Glycine max
(c) Glycyrrhiza glabra (d) Abrus precatorius
(e) Dolichos lablab

Kerala PMT-2008

Ans. (b) : The botanical name of soyabean is Glycine max. In India it is largely cultivated in Madhya Pradesh. Soyabean have rich source of protein.
Kingdom - Plantae
Order - Fabales
Family - Fabaceae
Subfamily - Faboideae
Genus - Glycine
Species – max

Name	Botanical Name
(i) Soyabean	*Glycine max.*
(ii) Pigeon pea	*Cajanus cajan*
(iii) Rosary pea	*Abrus precatorius*
(iv) Licorice	*Glycyrrhiza glabra*
(v) Hyacinth bean	*Dolichos lablab.*

212. Systema Naturae was written by

(a) Linnaeus (b) Aristotle
(c) Hippocrates (d) Darwin

JIPMER-2008

Ans. (a) : Systema Naturae was written by Carl Linnaeus, Linnaeus is also known as father of taxonomy. A book of binomial nomenclature introduced by a Swedish botanist, zoologist and physician Carolus Linnaeus.

213. Who credited with the introduction of binomial system of nomenclature of plants?

(a) Linnaeus
(b) John Ray
(c) Bentham and Hooker
(d) Aristotle

BVP-2002

Ans. (a) : The system of binomial nomenclature was established by Carolus Linnaeus in 1750 (According to some - 1751)

- Linnaeus published his work in the book **"Species Plantarum"** in 1753.
- It is a system of classification and naming a species given it a unique scientific name to avoid confusion
- Binominal nomenclature consist of two names in which first one indicate genus names while latter contains species names. For example - *Rana tigrina* is a binominal nomenclature for frog in which *Rana* indicates genus name while *tigrina* indicate species name.

214. Botanical name of arhu is :

(a) Prunus amygdalus (b) Prunus armeniaca
(c) Prunus persica (d) Prunus avium

Uttarakhand PMT-2006

Ans. (c) : The botanical name of arhu is *Prunus persica,* commonly known as peach.

- Peach (arhu) originated in China.
- It contain appreciable amount of vitamin A, C and niacin. Vitamin C content of the fruit rises as maturity progresses.

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215. Biosystematics aims at: -

(a) The classification of organisms based on broad morphological characters

(b) Delimiting various taxa of organism and establishing their relationships

(c) The classification of organisms based on their evolutionary history and establishing their phylogeny on the totality of various parameters from all fields of studies

(d) Identification and arrangement of organisms on the basis of cytological characteristics

AIPMT-2003

Ans. (c): Biosystematics is the study of identification, nomenclature, classification and relationships amongst living beings.

The study of genetic development of plant and animal population is the basis of biosystematic which is the classification of species. As a results, it takes into account the evolutionary history of these creatures and develops their phylogeny using a variety of different factors from all different scientific domains.

216. Which one of the following organisms is scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described

(a) Felis tigris - The Indian Tiger, well protected in Gir forests

(b) E.coli-Full name Entamoeba coli, a commonly occurring bacterium in human intestine

(c) Musca domestica - The common house lizard, a reptile

(d) Plasmodium falciparum - A protozoan pathogen causing the most serious type of malaria

AIPMT (Mains)-2012

Ans. (d) : *Plasmodium falciparum* - A protozoan pathogen causing the most serious type of malaria According to binomial nomenclature the scientific name consist of genus and species

- Both genus and species are either italicized or are underlined separately.
- In genus first letter is capital whereas species name is always written in lower case letters. *Musca domestica* is European housefly, it belongs to phylum arthropoda. E.coli is having full name Escherichia coli.
- *Felis tigris* is the scientific name of Indian tiger. The first letter of species Tigris is not written in capital letter.

217. Which of the following is the correct scientific name of wheat derived by binominal nomenclature?

(a) Triticum vulgare (b) Triticum aestivum

(c) Oryza sativa (d) Zea mays

AIIMS-2016

Ans. (b) : The Scientific name of wheat plant is *Triticum aestivum*.

- *Zea mays* → Corn (Maize)
- *Oryza sativa* → Rice
- *Triticum vulgare* → Synonym of wheat
- *Triticum aestivum* is scientific name of common wheat or bread wheat, and *Triticum vulgare* is the wheat used for germ oil which is rich in vitamin E.

218. Match the following columns and select the correct option

Column I		Column II	
(A)	Panthera tigris	(i)	Mango
(B)	Mangifera indica	(ii)	Common Indian frog
(C)	Musca domestica	(iii)	Cockroach
(D)	Periplaneta americana	(iv)	Tiger
(E)	Rana tigrina	(v)	House fly

(a) A - (ii), B- (v), C - (i), D - (iii), E - (iv)

(b) A - (iv), B - (i), C - (v), D - (iii), E - (ii)

(c) A - (ii), B - (v), C - (iii), D - (i), E - (iv)

(d) A - (iv), B - (i), C - (v), D - (ii), E - (iii)

AIIMS-2010

Ans. (b) :

Scientific Name	Common Name
Panthera tigris	Tiger
Mangifera indica	Mango
Musca domestica	Housefly
Periplaneta americana	Cockroach
Rana tigrina	Common Indian frog

219. Linnaeus evolved a system of nomenclature called:

(a) mononomial (b) vernacular

(c) binomial (d) polynomial

AIPMT-1993, 1990

Ans. (c) : Linnaeus evolved a system of nomenclature called binomial nomenclature.

- This system of nomenclature was established in 1750 AD by Swedish scientist named as Carolus Linnaeus.

220. The term "New Systematics" was introduced by:

(a) Bentham and Hooker

(b) Linnaeus

(c) Julian Huxley

(d) A.P. de Candolle

AIPMT-1988

Ans. (c) : Julian Huxley first used the term "New systematics" in 1940. The cytological, genetic, anatomical, morphological and physiological aspects of an organism are all taken into account in this classification.

- This system (biosystematics) is the taxonomy based on the study of generic evolution of animal and plant.

221. When the specific epithet exactly repeats, generic name. It is called as

(a) Tautonym (b) Synonym

(c) Basionym (d) Homonym

Punjab MET-2007

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Ans. (a) : Botanical name in which the specific name and generic name have same name or spelling called as tautonym.
Example -
Catla catla -(Gibelion catla)
Malus malus - (apple)
Axis axis (chital)
Dama dama (fallow deer)
Crocuta crocuta (spotted hyena)
Gazella gazella (chinkara).

222. Who gave the nomenclature according to which humans are called Homo sapiens?
(a) Darwin (b) Mendel
(c) Aristotle (d) Linnaeus

BCECE-2015

Ans. (d) : Linnaeus gave the nomenclature according to which humans are called *Homo sapiens*, in which Homo is genus, which includes early and modern humans and sapiens is specific name for humans

223. The binomial name in which names of genus and species are same is referred to as
(a) binomial nomenclature
(b) tautonym
(c) cladistics
(d) polytypic

MGIMS Wardha-2015

Ans. (b) : The binomial name in which name of genus and species are same is referred to as tautonym.
• There are many example of tautonym which are as following -
Axis axis (chital)
Bison bison (American bison)
Dama dama (fallow dear)

224. Binomial nomenclature means
(a) one name given by two taxonomists
(b) two names, the Latinized, other of a person
(c) two names, one scientific, other local
(d) two word names, the first indicates genus, and other species

AMU-2014

Ans. (d) : Binomial nomenclature is given by Linnaeus in which the scientific name of organism is completed into two part first one is generic name and second name is specific name.
Eg- *Rana tigrina, Homo sapiens*

225. Oryza sativa is the binomial name of the rice plant, the sativa stands for
(a) Specific name
(b) Specific epithet
(c) Species name
(d) Specific nomenclature

WB JEE-2008

Ans. (b) : *Oryza sativa* is the binomial name of the rice plant, the sativa stand for species epithet.

Oryza (↓ Generic name) sativa (↓ Species epithet)

• It is proper way of scientific name of any organism which completes into two part first one generic name and second one species epithet.

226. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature
(a) When written by hand, the names are to be underlined
(b) Biological names can be written in any language
(c) The first word in a biological name represents the genus name, and the second is a specific epithet
(d) The names are written in Latin and are italicised

NEET-2016 Phase-I

Ans. (b) : Two word are used in binomial nomenclature to name an organism. Genus and species are represented by the first and second words, respectively.
Allows write the initial letter of the genus in capital letters, the first latter of the species in small letters. Since the names are mostly taken from Latin and Greak, they are always written in that languages.
They are underlined if they are written by hand.
Due to international nomenclature restrictions. These cannot be written in any other language.

227. The scientific name of Kashmiri stag is
(a) *Sus salvanius*
(b) *Grus leucogeranus*
(c) *Cervus elaphus hanglu*
(d) *Ailurus ochraceus*

AP EAMCET-2010

Ans. (c) : The Kashmir stag (***Cervus elaphus hanglu***) also **called Hangul,** is a subspecies of Central Asian red deer endemic to Kashmir, India. It is found in dense riverine forests in high valleys and northern Chamba district in Himachal Pradesh. It is commonly found in **Dachigam National Park**.
• The *Sus salvanius* (commonly known as the pygmy hog) is found only in the reserve forest belts of the **Manas Wildlife Sanctuary** and the Bornadi Wildlife Sanctuary in northwestern, Assam, India.
• The *Grus leucogeranus* also known as the Siberian white crane or the snow crane is a bird of the family Gruidae.
• The *Ailurus ochraceus* is a species of mammals in the family Red pandas they rely on running to move around.

228. Match the following lists.

	List I (Common Name)	List II (Scientific Name)
(A)	**Cat fish**	**(i)** ***Clarias batrachus***
(B)	**Milk fish**	**(ii)** ***Chanos chanos***
(C)	**White shrimp fossilis**	**(iii) Heteropneustces**
(D)	**Grey mullet**	**(iv)** ***Mugil cephalus***
		(v) ***Penaeus indicus***

The correct match is :

	A	B	C	D
(a)	1	3	5	4
(b)	2	4	5	1
(c)	1	2	5	4
(d)	2	4	5	1

AP EAMCET-2010

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Ans. (c) **: List I** **List II**
(Common name)(Science Name)
Cat Fish - *Clarias batrachus*
Milk Fish - *Chanos chanos*
White shrimp - *Penaeus indicus*
Grey Mullet - *Mugil cephalus*

Clarias batrachus –is a native to southeastern Asia and has been introduced into many places for fish farming, **walking catfish** as it is commonly known is an opportunistic feeder and can go for month without food.
Chanos chanos – The **milkfish** is the sole living species of the world. It is found in the indo-west pacific from eastern and south-eastern Africa through India.
Mugil cephalus – The **flathead gray mullet** is an important food fish species in the mullet family mugilidae. It is found in coastal tropical and subtropical waters worldwide.
Penaeus indicus- The Indian prawn, is one of the major commercial prawn species of the world. It is found in the Indo-west pacific from eastern and south eastern Africa, through India, Malaysia and Indonesia to southern china and northern Australia.

229. Read the statements given below and identify the incorrect statement.
(a) Scientific names are used all over the world
(b) Scientific names are often descriptive and tell us some important character of an organism.
(c) Scientific names indicate relationship between species.
(d) Scientific names favour multiple naming for the same kind of an organism.

Karnataka CET-2012

Ans. (d) : Scientific name is unique to an organism. These names are used all over the world, to describe some important characters of organism. The scientific name is the taxonomic name given to the organism. The name is composed of the genus and the species. Hence, we can conclude that scientific names never favour multiple naming for the same kind of an organism. So, the option (d) is right answer.

230. Point out the correct method of showing scientific name of coconut palm derived by binomial nomenclature :
(a) Cocos nucifera (b) cocos Nucifera
(c) Cocos Nucifera (d) cocos nucifera

Karnataka CET-2012

Ans. (a) : The scientific name of coconut palm is *Cocos nucifera*, coconut palm belongs to the family Arecaceae It is cultivated extensively in tropical areas for its edible fruit, the coconut. The scientific name is used to identify the organisms and to avoid the confusion created by the local names.

231. Assertion (A) : The scientific name Malus malus is illegitimate.
Reason (R) : It is a tautonym
The correct answer is:
(a) Both (A) and (R) are true (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2005

Ans. (a) : According to binomial nomenclature each plant has been given a scientific name which consists of two parts. First part is genus and second part is species. The name is either underlined or written in italics. The scientific name Malus is illegitimate because it is just a tautonym and it does not follow the standard binomial nomenclature.
Malus malus is the scientific name of apple.

232. The scientific name of zebu is ……..
(a) *Bubalus bubalis* (b) *Gallus gallus*
(c) *Bos indicus* (d) *Bombyx mori*

Karnataka CET-2004

Ans. (c) : *Bos indicus*, sometime known as indicine cattle or humped cattle is a species of domestic cattle in south Asia.

Scientific Name	Common Name
Bubalus bubalis	Wild buffalo
Gallus gallus	Red junglefowl
Bos indicus	Zebu
Bombyx mori	Silk moth.

233. Which is not based on predictive generalisation or repeatable experimentation?
(a) Hypothesis (b) Theory
(c) Principle (d) Law

UP CPMT-2011

Ans. (a): Hypothesis is not based on predictive generalization or repeatable experimentation. Because A hypothesis is a supposition or proposed explanation that is made based on limited evidence as a starting point for furthest investigation.

234. Choose the correct combination of alphabets which matches the zoological names given under Column I with their common names given under Column II:

	Column I		Column II
A	***Labeo rohita***	E	**Jungle fowl**
B	***Gallus gallus***	F	**Carp**
C	***Bos indicus***	G	**Tussar silkmoth**
D	***Antheraea mylitta***	H	**Cattle**

(a) A = F, B = G, C = E, D = H
(b) A = G, B = E, C = H, D = F
(c) A = F, B = E, C = H, D = G
(d) A = F, B = E, C = G, D = H

Karnataka CET-2002

Ans. (c) :

	Column I	Column II
A	*Labeo rohita*	Carp
B	*Gallus gallus*	Jungle fowl
C	*Bos indicus*	Cattle
D	*Antheraea mylitta*	Tussar silkmoth

235. In biosystematics, the basis of classification is
(a) major morphological characters
(b) cytological characters
(c) evolutionary history considering various parameters from different fields of studies
(d) phenotypic relationships between species

MGIMS Wardha-2015

Ans. (c) : The classification of organism based on their evolutionary history and establishing their phylogeny on totality of various parameters from different fields of studies. This classification is referred to as Biosystematics.

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02 BIOLOGICAL CLASSIFICATION

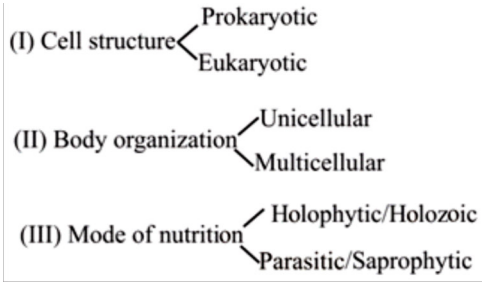
A. Categorization of Organisms and Kingdom System

1. The five-kingdom classification was suggested by

(a) Engler and prantl (b) Eichler
(c) Bentham and Hooker (d) Whittaker.

UPCPMT-2011, 2010
J&K CET-2010 / AFMC-2009
AIPMT-2002 / BVP-2001 / AIIMS-1994

Ans. (d) : The five kingdom classification was proposed by R.H Whittaker based on there characters.



2. In Whittaker's system of classification. prokaryotes belong to the kingdom of

(a) Monera (b) Protista
(c) Animalia (d) Fungi

J &K CET-2009, 2008
JIPMER-2008
MGIM Wardha-2008
BHU PMT (Screening)-2007

Ans. (a) : R. H. Whittaker divided living organisms into five kingdoms. The kingdom Monera is comprised of unicellular prokaryotic organisms. These are prokaryotic organisms which, lacks the nucleus, mitochondria and chloroplast, do not have well-developed cell organelles.

3. Choose the correct answer from the given statements below

(a) Cellular organization of the body is not required for metabolism
(b) Non living orgaism also shows reproduction
(c) Reproduction is synonymous with the growth in Amoeba
(d) Response of environment on living organism is called Irritability

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Some common synonyms of reproduction are copy, duplicate, facsimile and replica.
In unicellular organisms like bacteria, Unicellular algae and amoeba, reproduction is synonymous with growth i.c. increase one number of cells.

4. Bacteria that have specialized cell wall and plasma membrane structures to live and withstand the extreme environmental conditions

(a) Eubacteria (b) Cyanobacteria
(c) Archaebacteria (d) Mycoplasma

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Archaebacteria differ from other bacteria in having a different cell wall structure and this feature is responsible for their survival in extreme conditions. Archaebacteria are known as ancient bacteria.

5. Match List - I with List - II:

List-I		List-II	
A.	*Chlamydomonas*	i.	Conidia
B.	*Penicillium*	ii.	Zoospores
C.	Hydra	iii.	Gemmules
D.	Sponge	iv.	Buds

Choose the correct answer from the options given below:

(a) (A) - (i), (B) - (iv), (C)-(iii), (D)-(ii)
(b) (A) - (ii), (B) - (i), (C)-(iv), (D)-(iii)
(c) (A) - (iii), (B)-(ii), (C)-(i), (D)-(iv)
(d) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)

NEET (Re-Exam)-04.09.2022

Ans. (b) :

Chlamydomonas	- Zoospores
Penicillium	- Conidia
Hydra	- Buds
Sponge	- Gemmules

6. Which of the following organism is multicellular?

(a) Bacillus (b) Amoeba
(c) Yeast (d) Spirogyra

TS EAMCET-31.07.2022 Shift-I

Ans. (a) : Bacillus subtillis - Bacillus subtilis also known as the hay bacillus or grass bacillus is a Gram positive catalase positive bacterium found in soil and the gastrointestinal tract of ruminants humans and marine sponges Bacillus subtilis is rod shaped and can form protective endospore.

7. The number of cohorts in calyciflorae and heteromerae of Bentham and Hooker classification respectively are:

(a) 5 and 3 (b) 3 and 5
(c) 3 and 3 (d) 3 and 4

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : Calyciflorae in Bentham and Hooker system of classification the dicotyledons have subclass, series and coharts. The series (iii) (Calyciflorae) of subclass I (Polypetalae) have 5 cohorts. The last cohant is umbellales.

8. Statement 1 : Artificial system of classifications were incomplete and fragmentary.
Statement 2 : Artificial system of classifications always show inter relationships among the group of plants.

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(a) Statement 1 and statement 2 are true.
(b) Statement 1 is false, statements 2 is true.
(c) Both statements are false.
(d) Statement 1 is true and statement 2 is false.

AP EAMCET-12.07.2022 Shift-II

Ans. (d) : Artificial system of classification which is mainly based on the morphological characters, non evolutionary features. Theophrastus a Greek botanist and father of botany classified the plants into four habit herbs, undershrubs, shrubs and trees. He was the first to propose artificial system of classification.

9. Two animals belong to the same Kingdom but different classes. They may belong to the same_____

(a) Species (b) Phylum
(c) Division (d) Order

AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Several similar phyla are included in the kingdom, therefore, if two animals belong to the same phylum and they must also be in the same kingdom, but different classes.

10. Biosystematics aims at_____.

(a) The classification of organisms based on broad morphological characters
(b) Delimiting various taxa of organisms and establishing their relationships
(c) The classification of organisms based on their evolutionary history and establishing their phylogency on the totality of various parameters from all fields of studies
(d) Identification and arrangement of organisms on the basis of their cytological characteristics.

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : Biosystematics deals with the classification, identification and arrangement of organisms based on their biological characteristics. It aims at the understanding the evolutionary relationship between the different organism.

11. Engler and Prantl published a phylogenetic system in the monograph

(a) Die Naturlichen Pflanzen Familien
(b) Historia Plantarum
(c) Species Plantarum
(d) Genera Plantarum
(e) Origin of Species

AP EAMCET-2021, Shift-I
CMC Vellore-2008

Ans. (a) : German botanist Adolf Engler is renowned for his contributions to plant taxonomy and phytogeography, including Die Naturlichen Pflanzen Familien (the natural plants), which Karl von Prantl and he co-edited in 23 volume between 1887 and 1915. However, the Engler system of plant classification is widely used by many herbaria.

12. If the student wants to study the development of zygote, internal structure and function of various pairs to assign the organism to a particular phylum, the student takes the help of following branches?

(a) Development Biology, Anatomy, Physiology and Taxonomy
(b) Embryology, External Morphology, Physiology and Taxonomy
(c) Embryology, Anatomy, Osteology and Physiology
(d) Embryology, Histology, Physiology and Taxonomy

AP EAMCET-03.09.2021 Shift-I

Ans. (a) : Developmental biology : Includes production of gametes fertilization, development of embryo, etc.
• **Anatomy :** Anatomy is the study of the physical structure and parts of organism.
• **Physiology :** Physiology is the study of human and animals junction.
• **Taxonomy :** Includes, naming, describing and classifying organisms and includes all plants, animals and micro-organisms.

13. Assertion (A) : Using mathematic methods and computers, differences and similarities between taxa can be studied and is called as numerical taxonomy.
Reason (R) : Primitive and advanced characters are recognized as evolution which may be progressive or retrogressive.
The correct option among the following is
Options:

(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-28.09.2020 Shift-I

Ans. (b) : Numerical taxonomy was defined by Robert R. Sokal and Peter Sneath. It is a method of classifying organisms with the help of numerical methods. The phonetic similarity is the basis of this classification.

14. Match the following lists:

	List-I	List-II
(A)	Cell walls with silica, symmetrical rejuvenatory spores	(I) Actinomycetes
(B)	Holozoic nutrition, definite growth pattern, locomotion	(II) Chrysophyta
(C)	Zoospores, fusion of two gametes, endogenous spores, sporangia	(III) Phycomycetes
(D)	Branched filamentous, radical colonies, cell wall with mycolic acid	(IV) Animalia

The correct match is

	A	B	C	D
(a)	I	IV	II	III
(b)	II	IV	III	I
(c)	II	III	I	IV
(d)	IV	I	II	III

TS EAMCET-29.09.2020 Shift-I

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Ans. (b) :

List - I	List II
(A) Cell walls with silica, symmetrical rejuvenatory spores	(II) Chrysophyta
(B) Holozoic nutrition definite Growth pattern, locomotion	(IV) Animalia
(C) Zoospores fusion of two gametes, endogenous spores	(III) Phycomycetes
(D) Branched filamentous, radical colonies , cell wall with mycolic acid.	(I) Actinomycetes

15. Multicellular heterotrophs are placed in how many kingdoms by R.H. Whittaker ?

(a) 4 (b) 3
(c) 1 (d) 2

MHT CET-06.10.2020 Shift-I

Ans. (d) :

- Multicellular heterotrophs are included in the kingdom of fungi and animalia.
- These organisms have well develop nucleus and membrane bound organelles.

16. Assertion (A):Carolus Von Linnaeus popularized the binomial system of nomenclature and proposed sexual system of classification.
Reason (R): Sexual reproduction in plants was discovered by Camerarius.
The correct option among the following is

(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true.

TS EAMCET-29.09.2020 Shift-II

Ans. (b) : (A) is true, (R) is true and (R) is the correct explanation of (A)
The discovery of sex in plants is usually credited to Camerarius (1964) and Koelreuter (1761) is generally believed to have made the first systematic study of plant hybrids.

17. The study of different kinds of organisms, their diversities and relationship among them is studies in:

(a) Biodiversity (b) Plant taxonomy
(c) Systematics (d) α-Taxonomy

TS EAMCET-29.09.2020 Shift-II

Ans. (c) : Systematics is the study of organism identification, classification and nomenclature. It is concerned with the evolution of organism relationship, classification of organism into various kingdoms have been done by systematic.

18. Who proposed the sexual system of classification?

(a) N. Grew
(b) Marcello Malpighi
(c) Carolus Van Linnaeus
(d) Robert Hooke

AP EAMCET-24.09.2020 Shift-II
UPCPMT-2012

Ans. (c) : The sexual system of classification is based on the androecium structure. It was given by Linnaeus, he divided the plants into 24 groups depending on the number, union and length of stamens.

19. Who suggested the third kingdom Protista?

(a) R.H. Whittaker (b) Carl Linnaeus
(c) Haeckel (d) Carl Woese

MHT CET-08.10.2020 Shift-I

Ans. (c) : Linnaeus - Proposed two kingdoms. Plantae and Animalia.

- **Hackel** gaves third kingdom system for all micro organism unicellular organism called it Protista.
- **R.H whittaker-** proposed five kingdom theory

(i) Monera, (ii) Protista, (iii) Fungi (iv) Plantae (iv) Animalia

- **Carl woese:** - Proposed six kingdom theory.

20. Which of the following statements is correct regarding Mangifera indica, Solanum tuberosum (potato) and Panthera leo (lion)?

(a) indica, tuberosum and leo, represent the genera.
(b) Mangifera, Solanum and Panthera are specific epithets
(c) Mango belongs to Solanacea, Potato belongs to Family Anacardiaceae and Lion belongs to Canidae
(d) Mango belongs to Anacardiaceae, Potato belongs to Solanacea and Lion belongs to family Felidae

AP EAMCET-25.09.2020 Shift-I

Ans. (d) : Mangifera indica, commonly known as mango is a species of flowering plant in the family Anacardiaceae.

- Solanum tuberosum - belong to family Solanaceae family. The lion (Panthera leo) is a large cat of the genus Panthera native to Africa and India. It belong to family Felidae.
- It has muscular Broad-chested body is short rounded head round ears and a hairy is tuft at the end of its tail.

21. Study the following statements.

(I) Circular naked DNA is the genetic material
(II) Membrane bound cell organelles are present.
(III)Cell membrane infoldings called mesosomes present.
(IV) Nuclear membrane absent.

Arrange the given organisms based on their above respective characters and give the ratio.

(A) Bacillus **(B) Nostoc**
(C) Noctiluca **(D) Chlorella**
(E) Rhodospirillum **(F) Trichodesmium**
(G) Amoeba **(H) Euglena**

Options:

(a) 4:3:4:4 (b) 4:4:3:4
(c) 2:2:2:1 (d) 2:2:1:2

AP EAMCET-24.04.2019 Shift-II

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Ans. (d) : The circular naked DNA is the genetic material of prokaryotes like Nostoc, Anabaena

- Membrane bounded cell organelles are present in both prokaryotes and eukaryates , single cell membrane bounded organelles, vacuole, lysosome, Golgi apparatus, Endoplasmic reticulum.
- Nuclear membrane absent in Kingdom Monera because they lack well defined nucleus and other membrane bounded cell organelles, mitochondria, golgi apparatus and chloroplast.

22. Assertion (A) : The six kingdom classification proposed by Carl Woese included Bacteria, Archaebacteria, Protista, Fungi, Plantae and Animalia.
Reason (R) : Carl Woese divided six kingdoms into 2 domains using 16s rRNA.
The correct answer is
(a) Both (A) and (R) are true, (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

TS EAMCET-08.05.2019 Shift-I

Ans. (c) : Six kingdom classification was proposed by Carl Woese. These six kingdoms are
Kingdom - Archaebacteria
Kingdom - Eubacteria
Kingdom - Protista
Kingdom - Fungi
Kingdom - Plantae
Kingdom - Animalia

23. Which one of the following pairs was excluded from Whittaker's five kingdom classification?
(a) Viruses and lichens (b) Algae and euglena
(c) Lichens and algae (d) Euglena and viruses

KVPY SB and SX-2019

Ans. (a) : Viruses and lichens was excluded from Whittaker's five kingdom classification.
Whittaker has used five criteria for delimiting the different kingdoms.

- Complexity of cell structure - prokaryotic or eukaryotic.
- Mode of nutrition which is divergent in multicellular kingdoms photoautotrophy in plantae, absorptive heterotrophy in fungi and ingestive heterotrophy in animalia.
- Ecological life style like producers (plantae) decomposers (fungi) and consumers (animalia)
- Phylogenetic relationship.
- Monera all prokaryotic unicellular.
- Protista all Eukaryotic unicellular.

24. Find odd one out.
(a) Stamen (b) Stigma
(c) Style (d) Ovary

JIPMER-2019

Ans. (a) : odd option is (a)

- Stamen- The stamen is the pollen producing reproductive organ of a flower which is male part of the flower.
- Collectively stamens form the androecium.

25. Which among the following is not a prokaryote?
(a) Saccharomyces (b) Mycobacterium
(c) Oscillatoria (d) Nostoc

NEET-2018

Ans. (a) : Saccharomyces is a fungus i.e. yeast. Yeast belong to Eukaryotes. Yeast are single cell called **microorganism** classified as member of the fungus kingdom. The first yeast originated hundreds of millions of years ago. Almost 1500 species are currently recognized.

- They are estimated 1% of all described fungus species.
- Nostoc and Oscillatoria are Cyanobacteria while mycobacterium is true bacteria.

26. Natural system of classification of plant kingdom was proposed by
(a) Lam and Tuwill
(b) Benthum and Hooker
(c) Eichler and Engler
(d) Engler and Prantl

Tripura JEE-2018
VMMC-2013

Ans. (b) : Natural system of classification based on the all external visible character. This classification was first proposed by **A. L. de Jessieu** and **A.P. de Candole** later on supported by Bentham and Hooker.

- George Bentham and Joseph Doltan Hooker are the british scientist who were working in the Royal Botanical Garden, Kew, England.
- They wrote the book **Genera Plantarum**. Bentham and Hooker describe 200 family in the book.

27. New Systematics introduced by Sir Julian Huxley is also called as
(a) Phonetics
(b) Cladistics
(c) Biosystematics
(d) Numerical Taxonomy
(e) Chemotaxonomy

Kerala PMT-2008

Ans. (c) : The concept of new systematics or biosystematics was given by J. Huxley (1940). It deals with subspecies and populations to explain population systematics.

- Biosystematics considers besides morphology, other aspects also like ecology, biochemistry, physiology, cytology and genetics.

28. Match the following column I with column II.

Column I		Column II	
A.	**Cytology**	**1.**	**Study of fossils**
B.	**Entomology**	**2.**	**Study of cells**
C.	**Palaeontology**	**3.**	**Study of birds**
D.	**Ornithology**	**4.**	**Study of insects**

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(a) A-2 B-3 C-4 D-1 (b) A-2 B-4 C-1 D-3
(c) A-1 B-2 C-4 D-3 (d) A-3 B-2 C-1 D-4

WB JEE-2015

Ans. (b) :
(A) Cytology - (2) Study of cells
(B) Entomology - (4) Study of Insects
(C) Palaeontology - (1) Study of fossils
(D) Ornithology - (3) Study of birds

29. Study the following lists

	List-I		List-II
(A)	**Cellulase**	**(I)**	**Cell wall of bacteria**
(B)	**Chitinase**	**(II)**	**Cell wall of plant cells**
(C)	**Lysozyme**	**(III)**	**Proteins**
(D)	**Protease**	**(IV)**	**Cell wall of fungal cells**
		(V)	**RNA**

The correct match is

	(A)	(B)	(C)	(D)
(a)	(II)	(IV)	(I)	(III)
(b)	(II)	(I)	(IV)	(III)
(c)	(V)	(I)	(III)	(II)
(d)	(V)	(IV)	(I)	(II)

TS EAMCET-2015

Ans. (a) :

	List-I		List-II
(A)	Cellulase	(II)	Cell wall of plant cells.
(B)	Chitinase	(IV)	Cell wall of fungal cells
(C)	Lysozyme	(I)	Cell wall of Bacteria
(D)	Protease	(III)	Proteins

30. Which one of the following is not a eukaryotic organism?
(a) Euglena (b) anabaena
(c) Spirogyra (d) Agaricus

Assam CEE-2014

Ans. (b) : They are organism whose cells have a nucleus enclosed within membranes, unlike prokaryotes which have no membrane-bound organelles are called eukaryotes.
Anabaena - It is nitrogen fixing blue green algae. They are both in solitary and colonial forms.

31. 'Genera Plantarum' was written by
(a) Hutchinson
(b) Bessey
(c) Bentham and Hooker
(d) Linnaeus.

AIIMS-1994

Ans. (d) : Linnaeus gave artificial classification and after that in 1862 Bentham and Hooker also wrote new Genera planterum.
• Genera plantarum was written by Carolus Linnaeus in 1753. But they gave biggest and natural classification of spermatophyta.

32. The Phylogenetic System of classification was put forth by
(a) Carolus Linnaeus
(b) George Bentham and Joseph Dalton Hooker
(c) Aristotle
(d) Theophrastus
(e) Adolf Engler and Karl Prantl

VMMC-2013
Kerala PMT-2009

Ans. (e) : The phylogenic classification of the plant kingdom was proposed by Adolf Engler (1844 – 1930) and his associate Karl prantl (1849 – 1893), in their book Die Natrulichen Pflanzen Familien. This classification was also adopted by the John Hutchinsion in two volumes of his book "The families of flowering plant phylogenetic classification is based on common evolutionary descent".

33. Consider the following statements with respect to characteristic features of the Kingdom.
A. In Animalia the mode of nutrition is autotrophic
B. In Monera the nuclear membrane is present
C. In Protista the cell type is prokaryotic
D. In Plantae the cell wall is present
Of the above statements
(a) A alone is correct
(b) B alone is correct
(c) C alone is correct
(d) D alone is correct
(e) A, B and C are correct

Kerala PMT-2012

Ans. (d) :
(d) In Plantae, the cell wall is present.
(a) In Animalia, the mode of nutrition is Holozoic or Heterotrophic, Saprophytic.
(b) In Monera, the nuclear membrane is absent.
(c) In Protista, the cell type is unicellular Eukaryotic. .

34. Pick up the wrong statement
(a) Nuclear membrane is present in Monera
(b) Cell wall is absent in Animalia
(c) Protista have photosynthetic and heterotrophic mode of nutrition
(d) Some fungi are edible

AIPMT (Re-Exam)-2015

Ans. (a) : The member of kingdom – **Monera are prokaryote they lack nuclear membrane.**
- Absence of nuclear envelope around nucleus and absence of membrane bound cell organelle is characteristics of prokaryote.
- The taxon monera was first proposed as a phylum by Ernst Haeckel in 1866. Subsequently, the phylum was elevated to the rank of kingdom in 1925 by **Edouard Hatton.**

35. Five kingdom system of classification suggested by R.H. Whittaker is not based on:
(a) Presence or absence of a well defined nucleus
(b) Mode of reproduction
(c) Mode of nutrition
(d) Complexity of body organisation

AIPMT-2014

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Ans. (a) : The key principle for analysis by R.H. Whittaker include.
(1) **Complexity of cell structure** (eukaryotic or prokaryotic)
(2) **Body organization** (unicellular or multicellular)
(3) Thallus organization.
(4) **Mode of nutrition** (autotrophs or heterotrophs)
(5) Reproduction (sexual or asexual)
(6) Phylogenetic relationships
Based on these criteria, he classified organisms into five kingdoms-Monera, Protista, Fungi, Plantae and Animalia. Presence or absence of a well defined nucleus is not basis of whittaker's classification.

36. Arrange the following in the ascending order to Linnaean hierarchy.
(a) Kingdom - order - species - genus - class - family - phylum.
(b) Kingdom - family - genus - species - class - phylum - order.
(c) Kingdom - phylum - class - order - family - genus - species.
(d) Species - genus - family - order - class - phylum - kingdom.

Karnataka CET-2011

Ans. (d) : Various groups used in classification are called Taxa. The arrangement of Taxa is called hierarchy a species represent the smallest taxon although subgroup such as races are also used. Species → Genus → Family → Order → Class → Phylum → Kingdom.

37. An important criterion for modern day classification is:
(a) resemblances in morphology
(b) anatomical and physiological traits
(c) breeding habits
(d) presence or absence of notochord

AIPMT-1991

Ans. (b) : An important criterion for modern day classification is anatomical and physiological traits.
Modern day classification is a new systematic or bio systematics which includes all the characteristic of organisms gathered from the study of different sections like physiology, ecology, anatomy, cytology.
• The modern classification that is domain, kingdom, phylum, class, order, family, genus and species.

38. Systema Naturae was written by
(a) Linnaeus (b) Aristotle
(c) Hippocrates (d) Darwin

JIPMER-2008
DUMET-2008

Ans. (a) : Systema Nature was written by **Carl Linnaeus,** who is also known as father of taxonomy. A book of binomial nomenclature introduced by a Swedish botanist, zoologist and physician **Carolus Linnaeus** as the basis for Linnaean taxonomy.

39. Phylogenetic system of classification includes
(a) Evolutionary trends only
(b) Genetic trends only
(c) Evolutionary trend as well as morphology
(d) Behavrioural trends in environment

AIIMS-1995, 2014

Ans. (a) : There are many advantages to study the organism in point of view of evolution as you will know something very important feature of the organism. (that was developed first in that organism) and evolutionary history too.
• All the organisms belonging to the ancestral stock are taken in to consideration and their relations are established leading to the conclusion that they are evolutionary point of view related or not.

40. In five kingdom system of classification of RH Whittaker, how many kingdoms contain eukaryotes ?
(a) Four kingdoms (b) One kingdom
(c) Two kingdoms (d) Three kingdoms

Punjab MET-2008

Ans. (a) : Five kingdom classification was proposed by **R.H. Whittaker** in **1969**. Five kingdom system of classification of **R.H. Whittaker** distributed eukaryotes among four kingdoms Protista, Fungi, Plantae, and Animalia. Four kingdom are eukaryotes and Monera come under prokaryotes.

41. Match the following and choose the correct combination from the options given :

	Column-I (Kingdom)		Column-II (Class)
(A)	**Plantae**	**(1)**	**Archaebacteria**
(B)	**Fungi**	**(2)**	**Euglenoids**
(C)	**Protista**	**(3)**	**Phycomycetes**
(D)	**Monera**	**(4)**	**Algae**

(a) A–4, B–3, C–2, D–1
(b) A–1, B–2, C–3, D–4
(c) A–3, B–4, C–2, D–1
(d) A–4, B–2, C–3, D–1
(e) A–2, B–3, C–4, D–1

Kerala PMT-2011

Ans. (a) :

Column- I	**Column II**
(A) Plantae	(4) Algae
(B) Fungi	(3) Phycomycetes
(C) Protista	(2) Euglenoid
(D) Monera	(1) Archaebacteria

So the correct ans A -4, B - 3, C- 2, D- 1

42. Which is not true about prokaryotes?
(a) DNA is complexed with histones
(b) Well developed nucleus absent
(c) Mesosome present
(d) Mitochondria absent

DUMET-2006

Ans. (a) : The prokaryotic cells are unicellular organisms, which lack a true nucleus with well defined nuclear membrane and other organelles. The DNA in prokaryotes are naked meaning that it has no histones associated with it, and it is not formed into chromosomes.

43. Engulfing of food either in solid or liquid is called:
(a) sparozoic nutrition
(b) holozoic nutrition

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(c) parasitic nutrition
(d) saprophytic nutrition

J&K CET-2005

Ans. (b) : Holozoic nutrition is a type of nutrition where the food is taken in either solid or liquid form and is digested inside the body.

44. Study the following lists

List-I		List-II	
(A)	**Takhtajan**	**(I)**	**Five kingdom Classification**
(B)	**Linnaeus**	**(II)**	**Phylogenetic Classification**
(C)	**Warming**	**(III)**	**Artificial Classification**
(D)	**Carl Woese**	**(IV)**	**Classification of Communities based on relation of water**
		(V)	**Six kingdom Classification**

The correct match is

	A	B	C	D
(a)	(II)	(III)	(IV)	(V)
(b)	(IV)	(I)	(V)	(III)
(c)	(V)	(II)	(I)	(IV)
(d)	(V)	(IV)	(II)	(III)

TS EAMCET-15.05.2016

Ans. (a) :

List-I		List-II	
(A)	Takhtajan	(II)	Phylogenetic Classification
(B)	Linnaeus	(III)	Artificial Classification
(C)	Warming	(IV)	Classification of Communities based on relation of water
(D)	Carl Woese	(V)	Six kingdom

45. The book Genera Plantarum was written by
(a) Bessey
(b) Hutchinson
(c) Engler and Pranti
(d) Bentham and Hooker

BVP-2008

Ans. (d) : The book Genera Plantarum was written by – Carolus Linnaeus in 1753 and after 1862.
- The book new Genera Plantarum was written by - Bentham and Hooker.
- The book Family of flowering plant writing by Hutchinson.

46. A virus differs from a bacterium as it contains
(a) A cell wall
(b) Cytosol
(c) DNA as genetic material
(d) DNA or RNA as genetic material with no ribosomes

J&K CET-2011

Ans. (d) : A virus is made up of either DNA or RNA surrounded by a protective coat called a capsid, made of protein. It does not contain ribosomes or other cell organelles, and it does not have a cell wall nor cytoplasm.

47. The Kingdoms-Monera, Protista, Fungi, Plantae and Animalia are distinguished on the basis of :
(a) type of nutrition (b) type of cell
(c) type of reproduction (d) all of these

Haryana PMT-2000

Ans. (d) : The kingdam, Monera, Protista fungi plantae and animalio are classified on the basis of cell structure, body organization and mode of nutrition and type of reproduction.

48. As per Whittaker's classification, an organism possessing eukaryotic cell stucture, multicellular organisation, with a cell wall and nuclear membrane showing heterotrophic nutrition can be placed under the kingdom:
(a) Monera (b) Protista
(c) Plantae (d) Fungi
(e) Animalia

Kerala PMT-2014

Ans. (d) : Fungi are multicellular or single celled. They are eukaryotic as they have a well-defined nucleus with a nuclear membrane. They lack chlorophyll, hence, their mode of nutrition is heterotrophic. The cell wall is made up of chitin.

49. In the five kingdom system of classification, which single kingdom out of the following can include blue-green algae, nitrogen-fixing bacteria and methangenic archaebacteria?
(a) Monera (b) Fungi
(c) Plantae (d) Protista

Punjab MET-2010

Ans. (a) : Monera :- Monera is a biological kingdom that is made up of prokaryotes. As such, it is composed of single celled organism that lack of nucleus, e.g. blue green algae, nitrogen, fixing bacteria and methogenic archaebacteria are present in this kingdom.
Nitrogen fixing bacteria is two types-
(1) Free living- Cyanobacteria, Anabaena, Nostoc, Beijerinckia
(2) Symbiotic- e.g. Rhizobium, Frankia, Azospirillum.

50. Phylogenetic system of classification is based on:
(a) Floral characters
(b) Evolutionary relationships
(c) Morphological features
(d) Chemical constituents

AIPMT-2009

Ans.(b): Phylogenetic classification system is based on evolutionary relationships between the various organism are acceptable. This assumes that organisms belonging to the same taxa have a common ancestor. We now use information from many other sources too to help resolve difficulties in classification. These become more important when there is no supporting fossil evidence.

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51. Statement (S) : Linnaeus system of animal classification is essentially an artificial system, yet it has become a natural system.
Reason (R) : Similarities forming the basis of Linnaeus system are indicative of genetic relationship.
(a) Both (S) and (R) are true, and (R) is the correct explanation to (S)
(b) Both (S) and (R) are true, but (R) cannot explain (S)
(c) Only (S) is true and (R) is not true
(d) (S) is not correct and (R) cannot explain (S)
AP EAMCET-2006

Ans. (c) : Carlous Linnaeus divided the entire living world into two Kingdoms, namely, Animalia and Plantae. The artificial system of classification is based on locomotion type and the absence of chlorophyll. The Linnaeus system does not show genetic relationship or phylogeny.

52. Assertion : Phylogenetic systems of classification are considered as post Darwinian.
Reason : They are proposed after the publication of the book 'Origin of Species'.
The correct one is
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Assertion is false but Reason is true
AP EAMCET-2010

Ans. (a) : The phylogentic system of classification was proposed by Engler and Prantl.
- Phylogenetic Classification is based on the evolutionary descent of the group of organisms, the relationship illustrated via a phylogram phylogenetic tree or a cladogram **e.g. Engler and Prantl system, Takhtajan classification**.

53. Number of criteria used in classifying organisms in five kingdom classification is
(a) 5 (b) 4
(c) 3 (d) 2
AP EAMCET-2011

Ans. (a) : R.H Whittaker (1969) proposed an elaborate five kingdom classification - Monera, Protista, Fungi, Plantae and Animalia. The main criteria of the five kindom classification were cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationships.

54. Which of the following cannot determine phylogenetic relationship?
(a) Physiology (b) Morphology
(c) Biogeography (d) Embryology
AP EAMCET-2011

Ans. (b) : The phylogenetic relationship is the linkage between the two or more species. Some organisms appear to be closely related in many respects and it may seem to be distantly related in other respects. So, morphologically it cannot determine phylogenetic relationship.

55. In classification of Carolus Linnaeus, which was/were not included?
(a) Family and phylum (b) Animalia
(c) Plantae (d) All of the above
UP CPMT-2014

Ans. (a): In Linnaeus time a two kingdom system of classification, with Plantae and Animalia kingdoms was developed that included all plants and animals respectively hence, in classification of Linnaeus phylum and family were not included.

56. Prokaryotic genetic system has
(a) DNA and Histone
(b) DNA and no Histone
(c) No DNA and Histone
(d) No DNA and no Histone
UPCPMT-2002

Ans. (b) : The genetic system of prokaryotic cell have nucleoid, made of naked (without histone protein) and folded DNA which lies freely in the cytoplasm or in contact with a membranous structure called mesosome.

57. Plant cell is differ from animal cell because of :
(a) the presence of cell wall and absence of chlorophyll in plant cell
(b) the presence of cell wall and chlorophyll in plant cell
(c) the absence of cell wall and presence of chloroplast in animal cell
(d) the absence of cell wall and presence of chlorophyll in plant cell
MGIMS Wardha-2003

Ans. (b) : Plants have cell wall and chlorophyll which are responsible for photosynthesis in presence of light. In plants, the cell wall surrounds the cell membrane. This gives the plant cell its unique rectangular shape but in animal cell have a simply cell membrane without cell wall. Animal cell have lack of chlorophyll.

58. Phylogenetic classification is one which is based on:
(a) habits of plants
(b) utilitarian system
(c) over all similarities
(d) common evolutionary descent
J&K CET-2014
AFMC-2000

Ans. (d) : Phylogenetic classification system is based on evolutionary relationships between the various organism are acceptable.
This classification assumes that organisms belonging to same taxa have common ancestor.

59. Evolutionary history of an organisms is known as
(a) Phylogeny (b) Ancestry
(c) Palaeontology (d) Ontogeny
Manipal-2012

Ans. (a) : Phylogenetics classification is based on evolutionary history of an organisms. This classification was proposed by Adolf Engler and Karl Prantl and supported by Hutchinson, Takhtajan and Cronquist.
- Engler and Prantl are german botanist, they published a book of 200 volume from 1800-1899. The name of the book is Die Naturlichen Pflanzen Familien.
They divided the plant into 280 family.

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60. Which one is a prokaryote?
(a) Spirogyra (b) Agaricus
(c) Bacteriophage (d) Streptococcus
Manipal-2011

Ans. (d) : Prokaryotic cells are single celled microorganism known to be earliest on earth. The prokaryotic cell belongs to kingdom Monera.
•Prokaryotic cell does not have a nuclear membrane however the genetic material is present in a region is cytoplasm known as nucleoid prokaryotes includes mainly bacteria.
The Streptococcus are Gram positive and spherical or oval shape bacteria that form short or long chain.

61. The method of classification, called cladistics, is based on :
(a) natural system (b) mutation theory
(c) artificial system (d) evolutionary history
Manipal-2004

Ans. (d) : Cladistics refers to taxonomy by which the organisms are ranked and classified, according to the "recency of common descent". The categorical status of the animal according to this theory depends upon the position of branching points on the phylogenetic tree.
Clade term is used by Julian Huxley in 1958 and Coin and Harrison introduced the term cladistics in 1960.

62. The basic unit of classification of plants and animals is :
(a) genus (b) species
(c) order (d) family
Uttarakhand-2005
BHU PMT-2001

Ans. (b) : The species, the fundamental unit of taxonomic hierarchy. Davis called Building bricks in biological classification.
• In biological, phenomenon biosystematics concept is the older one. It is the lowest category of hierarchy which is consistently used and recognized by all the botanists.

63. Two kingdoms constantly figured in all biological classifications are
(a) Plantae and Animalia
(b) Monera and Animalia
(c) Protista and Animalia
(d) Protista and plantae
J&K CET-2008

Ans. (a) : In past all the organisms were split into two groups plants and animals, mainly on the basis of presence or absence of cell wall. This was also done by Linnaeus (father of Taxonomy). He founded two kingdoms Plantae and Animalia.

64. Phylogenetic system of classification was supported by:
(a) George Bentham (b) John Hutchinson
(c) Carolus Linnaeus (d) Father Santapau
Manipal-2000
JIPMER-1998

Ans. (b) : John Hutchinson was a British botanist associated with Royal Botanical Garden, Kew, (England).
• He developed and proposed his system based on Bentham and Hooker and also on Bessey, His phylogenetic system first appeared as "Families of flowering plants" in two volumes.
• The first volume contains dicotyledons and second volume contains monocotyledons. He made several revisions in different years and finally revision of "The families of flowering plants".

65. Classification of organisms based on evolutionary as well as genetic relationships is called
(a) Biosystematics (b) Phenetics
(c) Numerical taxonomy (d) Cladistics
DUMET-2010

Ans. (d) : Phyletic or Evolutionary or Phylogenetic character are used primarily in phylogenetic classification. The term phylogentic is used in many ways.
Ernst Haeckel (1886) used the term in evolutionary history of groups. Recently a particular approach to classification (cladism) have used phylogentic to refer to reconstructing only the branching sequence of phylogeny this approach is called cladistic with phylogenetics retained in its original and broader usage.

66. Scala naturae was written by
(a) Linnaeus (b) Darwin
(c) Aristotle (d) Whittaker
DUMET-2008

Ans. (c) : Aristotle developed the idea of ***Scala Naturae.*** to organize all things in the natural world, living and non-living things.
• Aristotle is known as father of biology. Aristotle's writings on biology, the first in the history of science are scattered acrossed several books forming about a quarter of his writings that has survived. The main biology texts were the history of animals, generation of animals, movement of animals.

67. Which of the following classification is based on some morphological characters?
(a) Artificial (b) Natural
(c) Phylogenetic (d) Both (b) and (c)
BHU PMT (Screening)-2010
DUMET-2008

Ans. (a) : Carolus Linnaeus was a great Swedish botanist and said to be the father of taxonomy. He outlined on artificial system of classification in Species Plantarum in 1753 where he listed and described 7300 species and arranged in 24 classes mostly on the basis of number, union, length and distribution of stamens.
• The classes were further subdivided on the basis of carpel characteristics into orders. Hence the system of classification is also known as sexual system of classification.

68. Which of the following have equal placement in the five kingdom classification on the basis of nutrition?
(a) Monera and Protista
(b) Protista and plantae
(c) Fungi and Animalia
(d) Plantae and Animalia
AMU-2011

@apna_pdf

Ans. (c) : Fungi is spore producing multicellular or multinucleate eukaryotic organisms. Basically unicellular yeast are also include amongst fungi because prokaryotes differ from all their sexual reproduction is similar to that of some fungi.

- Heterotrophic with absorptive type nutrition.
- It is either saprophytic or parasitic.
- Food reserve in glycogen and fat.
- Members of this kingdom are known as metazoa or multicellular animals.
- Organism multicellular eukaryotes.
- Body form is regular.
- Response to stimuli quick.
- Plastid and photosynthetic pigments are absent.

69. Which of the following is a prokaryote?

(a) Chlorella (b) Chlamydomonas
(c) Protomyces (d) Oscillatoria

AMU-2011

Ans. (d) : Oscillatoria is fresh water blue green algae (bacteria).

- Bacteria are placed under kingdom monera and they are prokaryotes.
- Oscillatoria plant body is called thallus.
- The unbranched filamentous structure of Oscillatoria is called trichomes.

70. On the basis of body organization, animals are grouped as

(a) Metazoa and Eumetazoa
(b) Protozoa and Parazoa
(c) Parazoa and Metazoa
(d) Protozoa and Metazoa

CG PMT-2007

Ans. (d) : Protozoa is unicellular where as Metazoa are multicellular. Protozoa are animal like protista and are believed to be primitive type of animal metazoa are divided into invertebrate and vertebrate.

- Both protozoans and metazoans are eukaryotic organism and the cells lack a cell wall.

71. Binomial nomenclature indicates:

(a) genus and species (b) genus and family
(c) species and veriety (d) phylum and genus

Uttarakhand-2005

Ans. (a) : Binomial nomenclature was introduced by Carolus Linnaeus, the first term indicates the genus and second term indicates the species of the organism.

- Multiples local names make it extremely difficult to identify an organism globally and keep a track of the number of species thus it creates a lot of cunfusion.
- Every organism would have one scientific name which would be used by every one to identify an organism. This process of standarized naming is called as binomial nomenclature.
- In binomial nomenclature generic name and species name are used.

72. Hutchinson system of classification is:

(a) Natural (b) Artificial
(c) Phylogenetic (d) Binomial

Uttarakhand-2005

Ans. (c) : Phylogenetic classification is based on the study of evolutionary relationship of organisms. Evolutionary characters are also considered.

- This classification is expressed in the form of phylogenetic trees.
- This classification was proposed by Engler and Prantl.

73. The division of the plant kingdom into prokaryotic and eukaryotic is based on the character is of:

(a) nucleus (b) chromosomes only
(c) cell organelles (d) all of these

Haryana PMT-1999

Ans. (d) : Prokaryotes are one of the most ancient group of living organisms on earth.

- Prokaryotic is comparatively simpler and smaller than eukaryotic.
- Eukaryote contains true nucleus it means nuclear membrane is present.
- Double membrane bound cell organelles is absent in prokaryotic cells.

74. In five-kingdom classification, Euglena is placed in

(a) Monera (b) Protista
(c) Fungi (d) Animalia

Rajasthan PMT-2011

Ans. (b) : Euglena belongs to Kingdom Protista.

- Euglena shows mixotrophic nutrition.
- Euglena is autotroph due to presence of chloroplast.
- There is a presence of a flexible outer membrane known as pellicle.
- In Protista, all organisms are unicellular eukaryotic.

75. In five kingdom classification of Whittaker, eukaryotes were assigned to

(a) 3 of 5 kingdoms (b) 2 of 5 kingdoms
(c) 4 of 5 kingdoms (d) All the 5 kingdoms

HP CET-2012
AMU-2009
Uttarakhand PMT-2004

Ans. (c) : 5 kingdoms classification was proposed by R.H. Whittaker in 1969.
(i) Monera (ii) Protista (iii) Fungi (iv) Plantae
(v) Animalia

- In Monera, unicellular prokaryotic organisms are placed.
- In Protista, unicellular Eukaryotic organisms are placed.
- Only Monera kingdom, organisms are unicellular prokaryotic while other four kingdom are eukaryotic.

76. In the classification of Whittaker the kingdom Monera include :

(a) bacteria, cyanobacteria, and fungus
(b) bacteria and cyanobacteria
(c) fungus and algae
(d) lichens and bacteria

Rajasthan PMT-2000

@apna_pdf

Ans. (b) : In Kingdom Monera, unicellular prokaryotic organism are placed.
- Bacteria and cyanobacteria are unicellular prokaryotic organism.
- Bacteria are small single celled organisms.
- Cyanobacteria are also known as cyanophyta.
- Cyanobacteria are gram-negative prokaryotic perform oxygenic photosynthetic and also fix atmosphere.

77. The kingdoms-Monera, Protista, Fungi, Plantae and Animalia are distinguished on the basis of:
(a) type of nutrition (b) type of cell
(c) type of reproduction (d) all of these

VMMC-2002

Ans. (d) : An American taxonomist R. H. Whittaker in 1969 divided the living world into five kingdoms such that Monera, Protista, Fungi, Plantae and Animalia on the basis of complexity of cell structure, mode of nutrition, complexity of body organization, life cycle and source of nutrition.

B. Monera

78. Extra circular, double stranded, self-replicating DNA present in a bacteria is known as_____
(a) Cosmid (b) Nucleoid
(c) Phagemid (d) Plasmid

AP EAPCET-11.07.2022 Shift-I
Rajasthan PMT-2007, 2003
BVP-2005
JCECE-2004
AIIMS-1998

Ans. (d) : Plasmid are genetic element of DNA molecule in the form of extra chromosomal material discovered by Lederberg in 1952, smaller than nucleoid.

79. Plasmids are found in
(a) virus (b) bacteria
(c) fungi (d) viroid

MHT CET-2010
Rajasthan PMT-2009, 2005, 1996
Punjab MET-2009
CMC Vellore-2009
UP CPMT-2009, 2002
Manipal-2002
Karnataka CET-2001

Ans. (b) : Plasmid is a small circular, extra chromosomal genetic material found in bacteria and some other microorganism.
- Plasmid are physically separated from chromosomal DNA and can replicate independently.

80. _____is a bacterium commonly found in the animal and human intestines
(a) Escherichia coli (b) Bacillus anthracis
(c) Vibrio cholera (d) Corny bacterium

AP EAMCET-11.07.2022 Shift-II
Punjab MET-2011
DUMET-2011

Ans. (a) : Escherichia coli is a bacterium commonly found in the animal and human intestine. It is a symbiotic bacteria of intestine, but excess of E. coli can damage the lining of the small intestine. This can lead to stomach cramps, vomiting, diarrhoea etc.

81. Which of the following is autotrophic:
(a) Virus (b) Mycoplasma
(c) Nostoc (d) All of these

HP CET-2011 / VMMC-2005
AMU-2004 / BVP-2003

Ans. (c) : Nostoc– Genus of blue green algae with cells arranged in bead like chains that are grouped together in a gelatinous mass, ranging from microscopic to walnut sized masses of *Nostoc* may be found on soil and floating in quiet water .

82. Choose the correct pair form the following
(A) E.coli - Retains copy of genetic material
(B) Streptococcus pneumonia - F^+ and F^- cells
(C) Transduction - Capture of naked DNA
(a) B, C (b) B
(c) A (d) A, C

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : E.coli is a gram negative bacteria and faculative, Anaerobic, rod shaped, coliform bacterium of the genus comonly found in lower instine of worm blooded organism and retain copy of genetic material.
- Transduction is process by which A virus transfer genetic material from one bacterium to another bacterium.

83. Identify the denitrifying bacterium
(a) Nitrosomonas (b) Nitrobacter
(c) Nitrococcus (d) Pseudomonas

TS EAMCET 10.05.2023 Shift-I

Ans. (d) : *Pseudomonas aeruginosa* is the species of denitrifying bacteria.
- Denitrifying bacteria are microorganisms that convert nitrates in the soil into free atmospheric nitrogen.
- Pseudomonas bacteria belongs to family Pseudomonadaceae which are Gream-negative bacteria.

84. Assertion (A) : Acetobacter is a pleomorphic bacteria
Reason (R) : Acetobacter changes shape depending on environment and nutrient availability
The correct option among the following is
(a) (A) and (R) are true (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET 10.05.2023 Shift-I

Ans. (a) : Pleomorphic bacteria are the bacteria that keep on changing their shape depending upon the type of environment and nutrients available. Ex. Acetobacter *Acetobacter aceti* is a gram-negative, obligate, aerobic, rod-shaped bacterium that can oxidize vinegar to carbon dioxide and water.

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85. Assertion (A) : Beggiotoa changes its shape.
Reason : (R) : Some bacteria change their shapes depending upon he type of environment
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct but R is not the correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Beggiatoa species are filamentous bacteria belonging to the gamily Beggiatoaceae that contains. several largest bacteria known today. It is sulphide-oxidizing bacteria.
Some bacteria change their shapes depending upon the type of environment are known as pleomorphic bacteria. Ex:- *Acebacter, Mycoplasma pneumonia*.
Thus, Assertion (A) is incorrect but reason (R) is correct**.**

86. Identify the organism based on their cell wall characteristics such as pseudomurein, mycolic acid, stiff cellulosic plates, chitin.
(a) Archeabacteria, Dinoflagellates, Fungi, Actinomyces
(b) Dinoflagellagtes,Actinomyces, Archaebacteria, Fungi
(c) Actinomyces Dinoflagellates, Archaebacteria, Fungi
(d) Archaebacteria, Actinomyces, Dinoflagellates, Fungi

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Archaebacteria- The cell wall of this bacteria are made up of the polysaccharide psedomurein. Pseudopeptidoglycan (PPG) is a major component of cell wall in Archaea.
Actinomycetes- Actinomycetes are related to both bacteria and fungi but are now recognized as prokaryotic organism close to the bacteria.
Mycolic acid are unique long chain fatty acids found in the cell wall of mycobacteria**.**
Dinoglagellates- The cell wall of dinoflagellates has stiff cellulose plates on the outer surface.
Fungi- The cell wall of fungi are composed of chitin & polysaccharides**.**

87. Wriggling movements of sporozoites are caused by
(a) Microtubules (b) Convoluted tubules
(c) Pseudopodia (d) Flagella

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : An uninucleate, spindle or sickle-shaped organism called sporozoite that are capable of wriggling movement. Each of them has a covering composed of elastic pellicle containing longitudinal contractile microtubules.
Spindle fibres are made up of microtubules. Microtubules are important for vesicular trafficking, morphogenesis. cellular mechanics polarity and motility of sporozoites.

88. Amphitrichous bacteria contains flagella like this
(a) Two flagella at each end
(b) Many flagella at each end
(c) Single flagella at each end
(d) Three flagella at three sides

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : In Bacteria ,on basis of the arrangement of flagella , it is of four types.
(i) Monotrichous
(ii) Amphitrichous
(iii) Lophotrichous
(iv) Peritrichous.
Amphitrichous bacteria having a single flagella at each end.

89. DNA of $\phi \times 174$ bacteriophage has
(a) 48502 Nucleotides
(b) 5386 Nucleotides
(c) 5386 Nitrogen base pairs
(d) 48502 Nitrogen base pairs

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : Bacteriaophage $\phi\times$ 174 is a single e-stranded DNA virus that infects Escherichia coli; and the first DNA based genome to be sequenced. In this bacteriophage, DNA is composed of 5386 nitrogen base pairs.

90. Which of the following bacteria get carbon from CO_2 but derive energy from oxidation of inorganic substances during bacterial nutrition?
(a) Bacillus and Xanthomonas
(b) Rhodospirillum and Rhodopseudomonas
(c) Chromatium and Chlorobium
(d) Nitrobacter and Beggiatoa

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : Nitrobacter and Beggiatoa are chemolithotrophic bacteria.
Chemolithoautotrophs is an autotrophic microorganism that obtains energy by oxidizing inorganic compound**.**
These organism obtain their energy from the oxidation of the inorganic compounds.

91. The early bacteria synthesized chlorophyll from
(a) Iron porphyrin
(b) Magnesium porphyrin
(c) Sulphur porphyrin
(d) Carbon porphyrin

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : Early bacteria synthesized chlorophyll from magnesium porphyrin. This is a crucial process for plants and other photosynthetic organisms to produce their own food.
Chlorophyll is a pigment responsible for capturing light energy during photosynthesis**.**
In its structure, a central magnesium atom is surrounded by a porphyrin ring which allow chlorophyll to absorb light and convert it into energy.

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92. The structures of the parent that disappear during binary fission of Euglena and develop a fresh in daughter euglenae

(a) Flagella and kinetosome
(b) Nucleus and basal granule
(c) Chromotophores and cytoplasm
(d) Stigma paraflagellar body and contractile vacuole

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : During binary fission of Euglena, the structures of the parents that disappears and develop a fresh in daughter Euglena is stigma, paraflagellar body and contractile vacuole.
During this fission, the nucleus divides into two daughter nuclei by mitosis followed by kinetosomes and the chromatophores.

93. Assertion (A) : Mary Mallon was nicknamed as 'Typhoid Mary'.
Reason (R) : Mary Mallon spread typhoid for several years through the food she prepared.

(a) Both A and R correct explanation of A
(b) Both A and R are correct but R is not correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct.

AP EAPCET-22.05.2023, Shift-II

Ans. (a) : Mary Mallon was a cook and carrier of a typhoid disease which she spread for several years through the food she prepared.
Typhoid is a disease which are caused by *Salmonella typhi* bacteria and also known as enteric fever.
Thus, Both Assertion (A) and Reason (R) are correct explanation of Assertion (A)

94. The correct match among the following

	Bacteria	Disease
I	Clostridium	Botulism
II	Diplococcus	Pneumonia
III	Treponema	Gonorrhoea
IV	Neisseria	Tetanus

(a) I & II (b) I & III
(c) II & IV (d) III & IV

AP EAPCET-22.05.2023, Shift-II

Ans. (a) : Botulism is a rare but deadly form of food poisoning. It is caused by a bacteria (clostridium botulinum) that is found all over, even in soil and water. Botulism is a rare but serious illness caused by a toxin that attacks the body's nerves and causes difficulty in breathing, muscle paralysis and even death.
Deplococcus, is the most common cause of bacterial pneumonia.
Hence, only I and II are correctly matched.

95. Structure of bacteriophages is complicated because they show

I. Polyhedral symmetry
II. Helical symmetry
III. Bilateral symmetry
IV. Radial symmetry

(a) III, IV (b) I, III
(c) II, III (d) I, II

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Structure of Bacteriophages is complicated because they show polyhedral and helical symmetry.
In helical structure nucleic acid surrounded by a hollow protein cylinder or capsid and possessing a helical structure.
In polyhedral structure nucleic acid is surrounded by a polyhedral capsid, usually in the form of an icosahedron.
Most of the phages have tailed phage morphology.

96. Two enzymes responsible for restricting the growth of bacteriophage were isolated from

(a) Salmonella (b) Agro bacterium
(c) Escherichia Coli (d) Archea bacteria

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : The two enzymes responsible for restricting the growth of bacteriophage were isolated from E.coli. Restriction enzyme is a protein isolated from bacteria that cleaves DNA sequences at sequence - specific sites, producing DNA fragments with a known sequence at each end. The use of restriction enzymes is critical to certain laboratory procedure including recombinant DNA technology and genetic engineering.

97. Which of the following is a correct statement?

(a) Mycoplasma have DNA, ribosome and cell wall.
(b) Cyanobacteria are a group of autotrophic organisms classified under Kingdom Monera.
(c) Bacteria are exclusively heterotrophic organisms.
(d) Slime moulds are saprophytic organisms classified under Kingdom Monera.

NEET-2022

Ans. (b) : Cyanobacteria or blue-green algae are the one of most successful autotrophic organisms. Cyanobacteria are the most self contained photosynthetic organisms. Cyanobacteria may be unicellular, colonial or filamentous. Ex-Oscillatoria.

98. Plasmid is

(a) extragenetic material in mycoplasma
(b) circular DNA in bacteria
(c) extra DNA in bacteria
(d) fragment of DNA inserted in bacteria for forming copies

AP EAMCET-12.07.2022 Shift-II
Punjab MET-2009

Ans. (d) : A plasmid is a small circular DNA molecule found in bacteria and some other microscopic organism. The insertion of a DNA fragments into a bacterial plasmid with the enzymes DNA ligase. The plasmid is cut open with a restriction nuclease in this case one that produces cohesive ends and is mixed with DNA fragment to be cloned.

99. Which of the following show the presence of chromatophores?

(a) Photosynthetic autotrophic eubacteria
(b) Heterotrophic bacteria
(c) Chemosynthetic autotrophic bacteria
(d) Branched filamentous bacteria

TS EAMCET-30.07.2022 Shift-I

@apna_pdf

Ans. (a) : Chromatophores are pigment containing vesicles that are found in cytoplasm. They are present in prokaryotes such as photosynthetic autotrophic eubacteria.

100. Antibiotics are produced by _____

(a) Virus (b) Bacteria
(c) Protozoans (d) Cyanobacteria

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Antibiotics are chemicals that inhibit or kill the growth of bacteria and are used to treat bacterial infection. They are produced by bacteria and fungi.

101. Which of the following statements is not true about bacterial cell?

(a) Possess genetic material not bounded by nuclear membrane.
(b) Small circular DNA molecules are present in the cytoplasm.
(c) Pili and fimbriae are extracellular structures for motility.
(d) The cell envelop is composed of glycocalyx, cell wall and plasma membrane.

TS EAMCET-30.07.2022 Shift-II

Ans. (c) : Pili and Fimbriae– Pilli are hair like, cell wall of bacteria smaller that filagella are involved in the conjugation of bacterial cells, promoting the initial joining of mating pairs, short pili are known as fimbriae means for attachment on the substratum of the bacterial cell.

102. Choose the incorrect statement regarding Archaebacteria

(a) They are halophiles and thermoacidophiles
(b) The cell wall contains peptidoglycan
(c) The cell membrane contains branched chain lipids
(d) They are responsible for the production of Methane from the dung of animals

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Archaebacteria:– It is unicellular, prokaryotic organism. The cell wall consist of complex proteins and non cellulosic polysaccharide but peptidoglycan is absent in cell wall. The cell membrane made up of branched chain of lipid due to the presence of lipid chains, they are resistant to high temperature, salinity, radiation and change in pH.

103. Archaebacteria differ from eubacteria in:

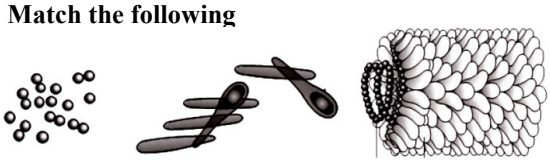
(a) Cell membrane
(b) Mode of nutrition
(c) Cell shape
(d) Mode of reproduction

AP EAMCET -03.09.2021, Shift-I
AIPMT-2014

Ans. (a) : The archaebacteria are the 'primitive' bacteria that include extremophiles like methanogens, halophiles and thermophiles. They represent some of the most ancient of life forms that persist today. They have both eubacterial and eukaryotic characters besides the features unique to them. Their mode of reproduction, nutrition and cell shape and size resembles a typical eubacteria. Their cell walls are made of a variety of polymers, but do not contain peptidoglycan unlike eubacteria.

• Archaebacteria differs from eubacteria only in the cell membrane. The membrane lipids present in archaebacteria are ether-linked, whereas, the eubacteria contain ester-linked membrane lipids.

104. Match the following

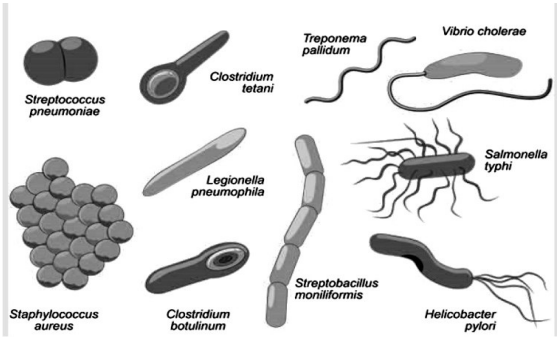


(a) A–Tobacco mosaic virus, B– Coccus, C–Bacillus
(b) A–Coccus, B–Bacillus, C–Tobacco mosaic virus
(c) A–Bacillus, B–Coccus, C–Tobacco mosaic virus
(d) A–Coccus, B–Tobacco mosaic virus, C–Bacillus

AP EAMCET-03.09.2021 Shift-I
AIIMS-25.05.2019 Shift-I

Ans. (b) : Bacteria are of various shapes and sizes. The four basic shapes of bacteria are bacillus (rod-like), Coccus (Spherical), Vibrio (Comma-shaped) and spirillum (Spiral).

• TMV is made up of a piece of nucleic acid (RNA) and is surrounding a protein coat. The complete virus is a submicroscopic, rigid, rod-shaped particle.



105. The use of friendly bacteria for therapeutic use is a concept of _____

(a) Antibiotic (b) Probiotics
(c) Beverages (d) Enzymes

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : The use of friendly bacteria for therapeutic use is a concept of Probiotics. They fight off the bad bacteria and restore the balance within your body, making you feel better.

106. Bacteria possess following appendages EXCEPT _____.

(a) flagella (b) fimbriae
(c) cilia (d) pili

MHT CET 5.10.2020 Shift-I

Ans. (c) : Bacteria have different appendages like flagella, fimbriae and pili and they are used for motility and attachment. A flagellum is a whip-like structure that allow a cell to move most Gram - negative bacteria. Fimbriae have hair-like projections external to the cells that allow bacteria to stick to the cells they infect.
Cilia are not found in bacteria.

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107. Smallest bacterial genome is seen in _____.
(a) *Methanococcus jannaschii*
(b) *Mycobacterium genitalium*
(c) *Heamophilus influenzae*
(d) *Saccharomyces cerevisiae*

MHT CET 5.10.2020 Shift-I

Ans. (b) : *Mycobacterium genitalium* has the smallest genome of organism that can be grown in pure culture.
- It has a minimum metabolism and little genomic redundancy. Its genome is expected to be a close approximation to the minimum set of genes needed to sustain bacterial life.

108. The sites of nitrogen fixation in blue green algae are _____.
(a) vegetative cells (b) apical cells
(c) heterocysts (d) basal cells

MHT CET 5.10.2020 Shift-I

Ans. (c) : A heterocyst is a nitrogen - fixing cyanobacterial cell that has undergone differentiation.
- Under anaerobic conditions, the heterocysts serve as nitrogen fixation sites. They arise as a result of a deficiency of fixed nitrogen.
- Heterocysts are found in many species of filamentous blue-green algae. They are cells of slightly larger size and with a more thickened wall than the vegetative cells.

109. Match the following lists:

List – I		List - II
A. Leeuwenhoek	**I.**	**Link to infections disease**
B. Louis Pasteur	**II.**	**Description of bacteria**
C. Koch	**III.**	**Coined the term bacteria**
D. Ehrenberg	**IV.**	**Chemical factories**

The correct match is

	A	B	C	D
(a)	II	III	I	IV
(b)	I	II	III	IV
(c)	III	IV	I	II
(d)	II	IV	I	III

TS EAMCET-29.09.2020 Shift-I

Ans. (d) :

List-I	**List-II**
A. Leeuwenhoek	II. Description of bacteria
B. Louis Pasteur	IV. Chemical factories
C. Koch	I. Link to infections disease
D. Ehrenberg	III. Coined the term bacteria

110. Based on the following characters identify the organisms respectively
– Cell wall with pseudomurein
– Cell wall with mucopeptide
– Marine bioluminescence
– Cell wall made of protein rich pellicle and found in stagnant water
(a) Methanogens, Bacillus, Noctiluca, Euglena
(b) Bacillus, Methanogens, Noctiluca, Euglena
(c) Noctiluca, Euglena, Methanogens, Bacillus
(d) Euglena, Noctiluca, Bacillus, Methanogens

TS EAMCET-28.09.2020 Shift-II

Ans. (a) : The cell wall with pseudomurein is present methanogens
- The cell wall with mucopeptide is found in Bacillus.
- Noctiluca is marine bioluminescences protozoa.
- The cell wall of Euglena made up of protein rich pellicle and found in stagnant water.

111. 250 grams of which microbes, among the following, can produce 25 tons of protein?
(a) Methanobacterium (b) Spirulina
(c) Brevibacterium (d) Methylophilus

AP EAMCET-24.09.2020 Shift-II

Ans. (d) : It has been observed that about 250 gm of Methylophilus produces 25 tones of proteins per day because of its high rate of biomass production and growth.

112. Escherichia coli is extensively used in biological research because it is _____
(a) Easily cultured
(b) Easily available
(c) Easy to handle
(d) Easily multiplied in host

AP EAMCET-24.09.2020 Shift-II
AIPMT-1993

Ans. (a) : E. coli is extensively used in biological research because it is easily cultured on minimal medium and has fast rate of multiplication and short generation time.

113. The structure present in cyanobacteria (BGA) helping is N_2 fixation is
(a) haplosperm (b) holostrum
(c) holotrema (d) heterocyst

Punjab MET-2008
TS EAMCET-29.09.2020 Shift-II

Ans. (d) : The structure present in Cyanobacteria(BGA) helping in N_2-fixation is called **heterocyst.**
- The trichome of *Nostoc* are characterized by the presence of heterocysts which are intercalary. The intercalary heterocyst has two polar nodules and the terminal ones have only one polar nodule.

114. Which of the following statements about inclusion bodies in incorrect?
(a) These are involved in ingestion of food particles
(b) They lie free in the cytoplasm
(c) These represent reserve material in cytoplasm
(d) They are not bound by any membrane

NEET-2020 Phase-I

Ans. (a) : Inclusion bodies are particles that are freely found in the cytoplasm of the cell.
- They are formed via multiplication of virus or bacteria in the host cell and can also be used for diagnosis of the respective viral or bacterial disease.
- They help in storage of cellular metabolic products and are not membrane bound.
- Inclusion bodies don't play a role in ingestion of food particles.

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115. Inclusion bodies of blue-green, purple and green photosynthetic bacteria are

(a) Microtubules (b) Contractile vacuoles
(c) Gas vacuoles (d) Centrioles

NEET-2020 Phase-II

Ans. (c) : Blue green algae, purple and green photosynthetic bacteria have gas vacuole as inclusion bodies.

- Inclusion bodies are reserved materials found in prokaryotic cells and are stored in cytoplasm.
- They are gas vacuoles and cyanophycean granules.

116. Which of the following is incorrect about Cyanobacteria?

(a) They have chlorophyll A similar to green plants
(b) They are photoautotrophs
(c) They lack heterocysts
(d) They often form blooms in polluted water bodies

NEET-2020 Phase-II

Ans. (c) : Cyanobacteria have heterocysts that fixes atmospheric nitrogen to NO_2, NO_3^+.

- Heterocysts or heterocytes are specialized nitrogen - fixing cells formed during nitrogen starving by some filamentous cyanobacteria, such as Nostoc, *Anabaena.*
- They fix nitrogen from dinitrogen (N_2) in the air using the enzyme nitrogenase.

117. The main difference in Gram (+)ve and Gram (–)ve bacteria resides in their:

(a) cell wall (b) cell membrane
(c) cytoplasm (d) flagella

WB JEE-2011
AP EAMCET-24.09.2020 Shift-II
AIPMT-1990

Ans. (a): Gram positive bacteria have cell walls composed of thick layers of peptidoglycan and Gram negative bacteria have cell wall composed of a thin layer of peptidoglycan.
Thus, the main difference in Gram (+ve) and Gram (–ve) bacteria resides in their cell wall.

118. Match the following lists:

	List -I		List-II
A	**Photoautotroph**	**I**	**Nitrosomonas**
B	**Chemoautotroph**	**II**	**Rhodospirillum**
C	**Photoheterotroph**	**III**	**Salmonella**
D	**Chemoheterotroph**	**IV**	**Chlorobium.**

The correct match is :

	A	B	C	D
(a)	IV	I	II	III
(b)	II	IV	III	I
(c)	II	I	IV	III
(d)	IV	III	II	I

TS EAMCET-08.05.2019 Shift-II

Ans. (a) :

	List -I		List-II
A	Photoautotroph	IV	Chlorobium
B	Chemoautotroph	I	Nitrosomonas
C	Photoheterotroph	II	Rhodospirillum
D	Chemoheterotroph	III	Salmonella

119. Identify combination of incorrect statements related to cyanobacteria

I. Cyanobacteria are referred to as blue-green algae
II. They perform oxygenic photosynthesis in chloroplasts
III. The red- colour of red-sea is due to the presence of a cyanobacterial species Trichodesmium erythraeum.
IV. All the cyanobacterial species can fix atmospheric N_2 in specialised cells called heterocysts.

(a) I, II (b) II, III
(c) II, IV (d) I, IV

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Cyanobacteria are referred to as blue green algae. They do not perform oxygenic photosynthesis in chloroplast. The red colour of red sea is due to the presence of a Cyanobacterial species *Trichodesmium erythraeum*.

- All the Cyanobacterium species cannot fix atmospheric N_2 in specialized cell called hetrocysts.

120. Microbes like Spirulina can be good alternate to the conventional sources of proteins for human nutrition, because …

(a) they give more biomass in less time
(b) they are produced using synthetic fertilizers
(c) their proteins are different from plant proteins
(d) they have high fibers content

Karnataka CET-2019

Ans. (a) : Microbes like Spirulina can be grown easily on materials like waste water, molasses, animal manure and sewage, to produce large quantity and can serve as food rich in protein minerals and nutrition because of a high rate of biomass in less time.

121. The following are true about culture media for microbes

(a) Lowenstein-Jensen medium is used to isolate mycobacteria
(b) Thioglycolate broth allows only anaerobes to grow
(c) MacConkey agar prevents the growth of Gram negative bacteria
(d) Sabouraud's culture is useful for culturing bacterial infection

SRM JEEE-2019

Ans. (a) : Jensen Medium better known as L.J medium, is a selective egg-based medium specifically used for the culture and isolation of Mycobacterium species, including Mycobacterium tuberculosis, form chemical specimens.

- In culture media for microbes, Lowenstein-Jensen medium is used to isolate mycobacterium.

122. Examples of photoautotrophic bacteria which capture light energy and transform it into chemical energy to obtain carbon from atmospheric carbon dioxide are

i. Anabaena **ii. Nitrosomonas**
iii. Chlorobium **iv. Xanthomonas**

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The correct combination is:

(a) i, ii (b) i, iii
(c) ii, iii (d) iii, iv

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : Anabaena has unseriate, straight, curved or coiled trichomes that may be constricted at the cell wall, the blue green to yellow – green colored cells may be spherical ellipsoidal, cylindrical.

- Chlorobium vesicles are protein – bound organelles that enclose photosynthetic pigments in the cytosol of photosynthetic green bacteria.

123. Match the following.

List-I	List-II	List-III
(A) Photoauto-trophs	i. Oxidation of inorganic substances	I. Bacillus
(B) Photohe-terotrophs	ii. Organic detritus	II. Beggiotoa
(C) Chemoauto-trophs	iii. Organic CO_2	III. Chromatium
(D) Saprophytes	iv. Atmospheric CO_2	IV. Rhodos-pirillum

The correct answer is

Options:

	A	B	C	D
(a)	iv, III	iii, IV	i, II	ii, I
(b)	iv, III	i, II	iii,IV	ii, I
(c)	iv, I	i, IV	iii, II	ii,III
(d)	iv, IV	iii, I	ii, III	i, II

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : Photoautotrophs are organism that use energy and inorganic carbon to produce organic materials.

Photoheterotrophs- They are organism that use light for energy but can not use carbon dioxide as their sole carbon source.

Saprophytes- Decomposed or decaying material is converted into simple organic materials called the saprophytes.

Chemoautotrophs- They are organism that obtains their energy from a chemical reaction.

124. Match the following lists :

v	List-I		List-II
A.	Photoautotroph	I.	Xanthomonas
B.	Photoheterotroph	II.	Rhodopseudomonas
C.	Saprophyte	III.	Bacillus
D.	Parasite	IV.	Chlorobium

The correct match is

	A	B	C	D
(a)	IV	I	II	III
(b)	IV	II	III	I
(c)	I	III	IV	II
(d)	II	IV	III	I

TS EAMCET-08.05.2019 Shift-I

Ans. (b) :

	List-I		List-II
A.	Photoautotroph	IV.	Chlorobium
B.	Photoheterotroph	II.	Rhodopseudomonas
C.	Saprophyte	III.	Bacillus
D.	Parasite	I.	Xanthomonas

125. Single chromosome with circular DNA as genetic material occurs in____

(a) E. Coli (b) Chlamydomonas
(c) AIDS virus (d) Yeast

MHT CET-2019

Ans. (a) : Single chromosome with circular DNA as genetic material occurs in E. coli. E. coli is a gram negative bacteria. It is rod shaped coliform bacteria of genus Escherichia that is commonly found in intestine of warm blooded organism.

126. Choose the mismatch bacteria in the given list

(a) *Xanthomonas oryzae*
(b) *Xanthomonos oxanopodis pv citri*
(c) *Agrobacterium tumefacience*
(d) *Bdellovibrio bacteriovorus*

AP EAMCET-24.04.2019 Shift-I

Ans. (d) : Bdellovibrio is a Gram-negative, obligate aerobic bacteria. They can prey upon other Gram negative bacteria and feed on the biopolymers eg. proteins and nucleic acids, of their hosts. They have two lifestyles a host- dependent, highly mobile phase, the attack phase in which they form bdelloplasts form.

127. Which of the following nucleic acids is present in an organism having 70 S ribosomes only?

(a) Double stranded circular DNA with histone proteins
(b) Single stranded DNA with protein coat
(c) Double stranded circular naked DNA
(d) Double stranded DNA enclosed in nuclear membrane

NEET (Odisha)-2019

Ans. (c) : 70S ribosome are present in prokaryotic species like bacteria, which also lack a nucleus and have double-stranded, circular naked DNA in their cytoplasm that is not protected by the nuclear membranes.

128. Match the organisms in column I with habitats in column II.

Column-I	Column-II
(A) Halophiles	(i) Hot springs
(B) Thermoacidophiles	(ii) Aquatic environment
(C) Methanogens	(iii) Guts of ruminants
(D) Cyanobacteria	(iv) Salty areas

Select the correct answer from the options given below :

(a) (A)-(ii), (B)-(iv), (C)-(iii), (D)-(i)
(b) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
(c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(d) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)

NEET (Odisha)-2019

Ans. (b) : Halophiles can be found in salty environments with high salt concentrations.

- **Thermoacidophiles** are a type of extremophilic microbe that can endure both high temperature and acidic environment.
- **Methanogens** are micro-organisms that generate methane as a metabolic by product in hypoxic conditions. It is found in guts of ruminants.

@apna_pdf

• **Cyanobacteria** are a group of photosynthetic bacteria, some of which are nitrogen fixing, that live in a wide variety of moist soils and water either freely or in a symbiotic relationship with plants or lichen forming fungi. They can also be found in aquatic environments.

129. Which of the following statements about methanogens is not correct ?

(a) They produce methane gas
(b) They can be used to produce biogas
(c) They are found in the rumen of cattle and their excreta
(d) They grow aerobically and breakdown cellulose-rich food

NEET (Odisha)-2019

Ans. (d) : Methanogens are the microorganisms that produce methane as a by product of its metabolic activities. They are anaerobic organisms which grow on cellulosic material which produce methane, carbon dioxide and hydrogen.

• Methanogens can be used to digest organic matter and thus, produce **biogas**. It is found in the rumen of cattle helps in digestion of cellulose and its breakdown into glucose, thus providing a source of energy for the cattle.

130. Identify the diagram of heterocyst.

(a)
(b)
(c)
(d)

JIPMER-2019

Ans. (a) : Blue green algae or cyanobacteria acquire the specialized cells known as heterocysts. Heterocysts is the site of N_2 fixation. It contains an enzyme nitrogenase, which help in nitrogen fixation. This diagram shows the hetrocysts of Nostoc bacteria.

131. Which statement is correct

(a) Mycoplasma is smallest and wall less living organism
(b) Influenza and herpes caused by virus having DNA and RNA
(c) Nostoc and Anabaena are important decomposer
(d) Methanogen are methane producing bacteria in wheat crop

AIIMS-26.05.2019 Shift-II

Ans. (a) : Mycoplasma are the smallest among the known aerobic prokaryotes. They were first discovered by Pasteur in 1843, during his work on the possible causal agent of pleuropneumonia of cattle. Therefore, they were called pleuro-pneumonia-like organism (PPLO).

• As they do not have cell wall they do not get affected by antibiotics and causes severe disease to the plants and animals. They can even survive without oxygen and respire anaerobically.

132. Study the following statements

(A) Archaea and Eukarya are more closely related to each other than bacteria
(B) R.H. Whittaker placed unicellular eukaryotic organisms in the kingdom Monera
(C) Carl Woes replaced Kingdom Monera with two kingdoms Bacteria and Archaea
(D) 24S subunit of ribosomal RNA is used in the identification of Microbes

In the above, incorrect statements are

(a) A, C (b) A, D
(c) B, C (d) B, D

AP EAMCET-25.04.2018 Shift-I

Ans. (d) : R.H Whittaker placed unicellular eukaryotic organism in the Kingdom Protista not placed in Monera.

• The subunit of ribosomal RNA is used in the identification of microbes 16 S rRNA.

133. Study the following statements

(i) Branched chain of proteins are present in membranes of Archaebacteria
(ii) Histones are absent in Noctiluca chromosomes
(iii) Asexual spores of diatoms are Auxospores
(iv) In Nostoc chromatin is present in centroplasm

Choose the correct answer

Options:

(a) i, ii, iii, iv (b) i, iv
(c) i, iii (d) ii, iv

AP EAMCET-25.04.2018 Shift-II

Ans. (d): Without histones the unbind DNA chromosomes would be very long. Nucleoid is occupied by an extremely involuted double stranded and nucleolus are absent in nucleoid.

• The single-celled Nostoc does not have a nucleus or other internal membrane systems and the cytoplasm is comprised of seventy to eighty-five percent water.

134. Bacterial flagella is made up of

(a) Microtubules (b) tubulin
(c) Flagellin (d) Spinin

SRM JEEE-2018

Ans. (c) : Bacterial flagella is made up of a protein referred to as **Flagellin**. It is found in the flagellar structure of many bacteria.

• Microtubule is highly dynamic polymers that are part of the cytoskeleton which provides structure and shape to the eukaryotic cells.
• Tubulin is found in centrosomes and spindle pole bodies.

135. Match the following

List-I		List-II	
A.	**Spirillum**	**(i)**	**comma shaped**
B.	**Vibrio**	**(ii)**	**helical**
C.	**Pleomorphic**	**(iii)**	**spherical**
D.	**Cocci**	**(iv)**	**elongated rods**
		(v)	**keep on changing their shape**

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The correct answer is

	A	B	C	D
(a)	(ii)	(i)	(v)	(iii)
(b)	(ii)	(v)	(i)	(iii)
(c)	(i)	(iv)	(iii)	(ii)
(d)	(iii)	(i)	(v)	(iv)

TS EAMCET-02.05.2018 Shift-II

Ans. (a) :

List-I		List II
(A) Spirillum	-	(ii) Helical
(B) Vibrio	-	(i) Comma shaped
(C) Pleomorphic	-	(v) Keep on changing their shape
(D) Cocci	-	(iii) Spherical

136. Which of the following is the non-pathogenic bacteria of colon?

(a) Escherichia coli
(b) Balantidium coli
(c) Entamoeba histolytica
(d) Enterbius vermicularis

HP CET-2018

Ans. (a) : Escherichia coli is a Gram-negative facultatively anaerobic, rod-shaped, coliform bacterium of genus Escherichia that is commonly found in the lower intestine of warm-blooded organisms, which is non pathogenic bacteria of colon.

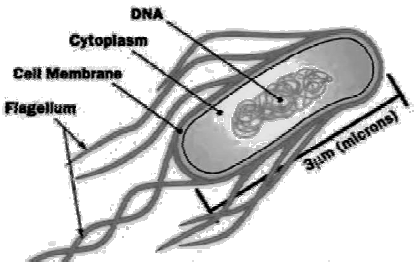
137. Which is incorrect about E.coli.

(a) It is diploid
(b) It is found in human intestine
(c) Transformation, Transduction, Conjugation can show
(d) Can be used in Recombinant DNA technology

AIIMS-27.05.2018 Shift-II

Ans. (a) : *Escherichia coli* is a gram-negative, facultatively anaerobic, rod-shaped, coliform bacterium of the genus Escherichia which is commonly found in the lower intestine of warm-blooded organisms. It is able to survive with or without oxygen and thus is a "facultative anaerobic".

- In bacteria there is only one copy of the chromosome, bacterial cells are considered haploid, for example, E. coli.



The E. coli bacterium

138. From which bacterium the REN-Sal-I is isolated?

(a) *Escherichia coli*
(b) *Streptococcus aureus*
(c) *Haemophilus influenzae*
(d) *Streptomyces albus*

Karnataka CET-2017

Ans. (d) : The restriction endonucleases Sal-I is isolated from the bacteria *Streptomyces albus.*
This is the first enzyme extracted from bacteria.

139. Restriction endonucleases are isolated from some bacteria. Their role in bacteria is:

(a) defence against virus
(b) synthesis of proteins
(c) act as genetic material
(d) help in reproduction

Karnataka CET-2017

Ans. (a) : Restriction endonucleases are naturally present in the bacteria where they provide protection against invading viral DNA. Hind II was first restriction endonuclease to be isolated and characterized. Today more than 900 restriction enzymes have been isolated from over 230 strain of bacteria.

140. Which of the following options show the characters of mycoplasma?

(a) Smallest living cell without cell wall survive with oxygen.
(b) Smallest living cell with cell wall survive with oxygen.
(c) Smallest living cell without cell wall survive without oxygen.
(d) Smallest living cell with cell wall survive without oxygen.

Karnataka CET-2017

Ans. (c) : Dienes and Edsall(1937) detected first Mycoplasma isolated from humans in a Bartholin's gland abscess. It is unicellular smallest prokaryotic organism, which is capable for independent growth, reproduction and metabolism, also called PPLO (pleuropneumonia like-organism) cell wall absent exhibit polymorphism called "Joker of the plant kingdom" cell membrane made up of lipoproteins, mesosomes are absent.

141. Read the following statement regarding bacteria.

I. Bacteria exchange their genetic matter through conjugation which involves cell to cell contact.
II. Transduction in 'Salmonella is reported by Tatum and Lederberg in 1952.
III. Citrus canker disease is caused by bacteria Xanthomonas citri.
IV. Hans Christian gram's staining method is based on cell wall composition of bacteria.

Choose the correct option with true statements

(a) I and III (b) I, III and IV
(c) I, II and III (d) II and IV

AIIMS-2017

Ans. (b) : Conjugation is the process of transfer of genetic material, that is associated with cell to cell connection, it was first reported in E. coli by Tatum and Lederberg in 1946.

- **Transduction** is a process of transfer of DNA by bacteriophage virus in bacteria. It was first reported in the Salmonella by Zinder and Lederberg in 1952.

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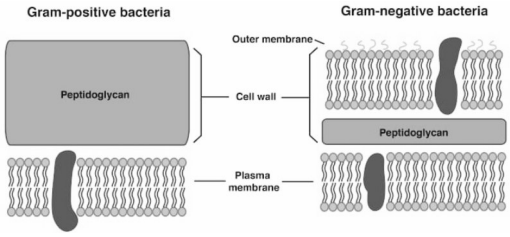
• **Gram Staining** is based on the composition or size of bacterial cell wall as Gram positive bacteria has thick cell wall compare to Gram negative bacteria.



142. *Treponema pallidum* is a ____bacterium.
(a) Streptococcus (b) Streptobacillus
(c) Spirochaete (d) Oligochaete

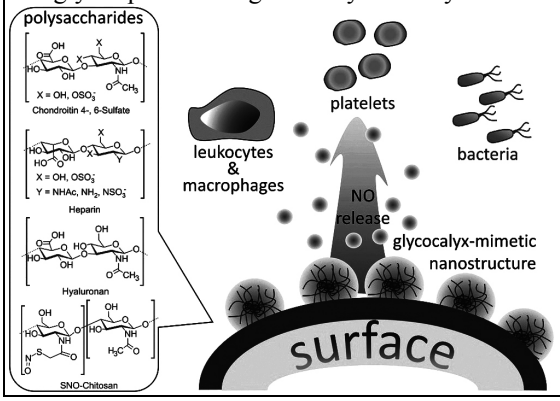
MHT CET-2017

Ans. (c) : *Treponema pallidum* formally known as *Spirochaete pallida*, is a spirochaete bacterium with various sub-species that cause the diseases syphilis, bejel, and yaws. *Treponema pallidum* is a Gram-negative bacteria which is a motile spirochaete bacterium.

143. Which of the following components provides sticky character to the bacterial cell?
(a) Cell wall (b) Nuclear membrane
(c) Plasma membrane (d) Glycocalyx

NEET-2017

Ans. (d) : The glycocalyx is a dense, gel-like meshwork that surrounds the cell constituting a physical barrier for any object to enter the cell. Glycocalyx is the outermost layer of the cell envelope in bacteria. It is a glycoprotein and glycolipid covering and may be slimy and sticky.



144. Which of the following are found in extreme saline conditions?
(a) Archaebacteria (b) Eubacteria
(c) Cyanobacteria (d) Mycobacteria

NEET-2017

Ans. (a) : Archaebacteria are found in extremely harsh environments. **Halophytes** are found in extreme saline conditions. The difference in their cell wall structure makes them survive in extreme conditions.

- There are three type of Archaebacteria. These are methanogens, halophiles, and thermoacidophiles.
- **Halophiles** (Salt loving) are the extremophile organisms that can survive in extreme saline conditions.

145. All monerans
(a) Contain DNA and RNA
(b) Demonstrate a long circular strand of DNA, not formed enclosed in a nuclear membrane
(c) Are bacteria
(d) All of the above

JIPMER-2017

Ans. (d) : The prokaryote with circular DNA is called Monera (lack a nuclear membrane). RNA is also a component of Monera. The Monera kingdom includes every kind of bacterium.

146. Teichoic acids are typically found in
(a) Outer membranes of gram positive bacteria
(b) Cell walls of gram positive bacteria
(c) Cell walls of gram negative bacteria
(d) outer membranes of gram negative bacteria

SRM JEEE -2017
UPCPMT-2011, 2009
J & K CET-2008

Ans. (b) : Teichoic acids are found within the cell wall of most Gram-positive bacteria such as species in the genera *Staphylococcus, Streptococcus, Bacillus, Clostridium, Corynebacterium and Listeria* and appear to extend to the surface of the peptidoglycan layer.

147. Microbes that inhibit the growth of other microorganisms termed as
(a) Synergism (b) Mutualism
(c) Parasitism (d) Antagonism

SRM JEEE -2017

Ans. (d) : It refers to the inhibition of one microorganism. It is also called the first line of defense.
• Microbes that inhibit the growth of other microorganisms termed as antagonism.

148. Most widely used bioweapon is
(a) Bacillus subtilis (b) Pseudomonas putida
(c) Bacillus anthracis (d) None of the above

BCECE-2010

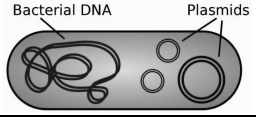
Ans. (c) : Spores of the bacteria Bacillus anthracis are essentially unbreakable and continue to function even when subjected to high temperature and ultraviolet radiation.

149. In bacteria, plasmid is : -
(a) Extra chromosomal material
(b) Main DNA
(c) Non functional DNA
(d) Repetative gene

AIPMT-2002

Ans. (a) : The bacteria have a extra-chromosomal material known as **plasmid**.

- The plasmid used in genetic engineering. It is a small, circular, double-stranded DNA molecule that is distinct from a cell's chromosomal DNA.
- It is the most commonly used bacterial cloning vector.
- It is naturally existing in bacterial cell and also occur in some eukaryotes.



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150. Choose the correct sequence of stages of growth curve for Bacteria

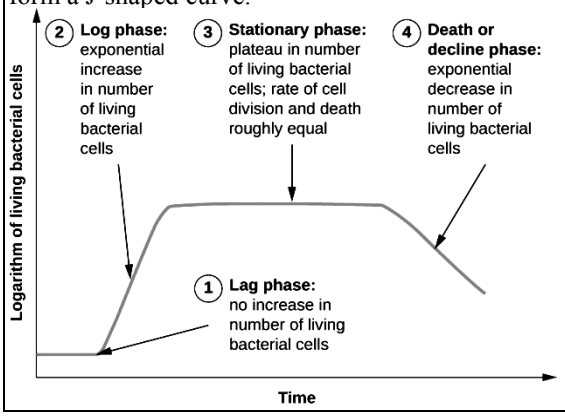
(a) Lag, Log, stationary, Decline phase
(b) Lag, Log, Stationary phase
(c) Stationary, Lag, Log, Decline phase
(d) Decline, Lag, Log phase

AIPMT-2002

Ans. (a) : When microbes are grown in a closed system or batch culture, the resulting growth curve has usually four phase-

1. Lag phase 2. Log phase
3. Stationary phase 4. Death phase

- Time-dependent size of a growing bacterial cell population is commonly represented in log-scale against time, in which case, the lag and the exponential phase form a J-shaped curve.



151. The semilog of per minute growing bacteria is ploted against time. What will the shape of graph

(a) Sigmoid
(b) Hyperbolic
(c) Ascending straight line
(d) Descending straight line

AIPMT-2002

Ans. (c) : The ascending straight line is the representation of the growth of bacteria per minute. It is basically the graphical representation of the increase in growth.

152. 'Comma' shaped bacteria are known as:

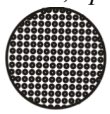
(a) coccus (b) spiral
(c) lophotrichus (d) vibrio

AFMC-2001

Ans. (d) : Comma shaped bacteria are called as Vibrio. It causes various systemic diseases such as cholera. Eg. *Vibrio cholera, Vibrio vulnificus* etc.

Coma shaped

- **Coccus or cocci–** It is spherical in shape smallest bacteria eg- *Diplodocus pneumonae*.
- **Spiral bacteria–** It is coiled in shaped eg- *Spirillum minus, Spirillum valutane*.


Spiral bacteria

Spiral Bacteria

Lophotrichus– The tuft of flagella at the end is called Lophotrichus, eg- *Salmonella, Spirillum valutan.*

Tuft

Lophatricus. B Lophatricous

153. What is the type of nutrition in purple and green sulphur bacteria ?

(a) Photoautotrophic (b) Chemoautotropic
(c) Photoheterotrophic (d) Chemoheterotrophic

TS EAMCET-2015

Ans. (a) : The nutrition found in purple and green sulphur bacteria is known as the **photoautotrophic type** of nutrition, the organism captures the photons from the sunlight and produces organic compound such as carbohydrates etc. and derives energy from them to survived.

- **Chemoheterotrophic–** Use the chemical energy for the synthesis of own food by breathing the inorganic and organic compound.

154. Bacterium responsible for retting of jute and flex is

(a) Lactobacillus (b) Clostridium
(c) Bacillus (d) Agro bacterium

UP CPMT-2013

Ans. (b) : The micro organism acclimated for the retting of jute is the butyric acid bacteria of Clostridium genera. Retting of jute is the extraction of fibers from the bast plant.

155. Which one of the following is not characteristic of gram-positive bacteria?

(a) Cell wall is smooth
(b) Mesosomes are distinctively prominent
(c) Basal body of flagellum contains 2 rings
(d) Outer membrane is present
(e) Murein content of cell wall is 70 - 80%

Kerala PMT-2008

Ans. (d) : On the basis of peptidoglycan in Gram positive bacteria is thick 70-80% in Gram negative bacteria peptidoglycan single layer thin 10-20%.

- In Gram negative bacteria out side of the peptidoglycan, other layer is present called liposaccharide due to which Gram negative bacteria are mostly pathogenic and liposaccharide layer absent in Gram positive bacteria but in Gram positive bacteria, teichoic acid is present and absent in Gram negative bacteria.
- Thickening of cell wall in Gram + ve bacteria 20-80 nm but in Gram – ve bacteria 8-12 nm.
- Gram positive bacteria non pathogenic and asceptable to antibiotics but Gram negative bacteria are resistance to antibiotics
- Mesosomes are prominent in gram positive but less prominent in gram negative bacteria.
- In Gram + ve bacteria blue voilet colour retains after the washing with alcohol, but in Gram –ve bacteria colour is washed.

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156. Bacteria with flagella all over its body, is called
(a) monotrichous (b) amphitrichous
(c) lophotrichous (d) peritrichous.
AIIMS-1994

Ans. (d) : Peritrichous :- When flagella are present all over the surface of bacteria is called **peritrichous** eg- *E. coli, Salmonella, Proteus vulgaris.*

Peritricus

157. Single filament of Nostoc without mucilage sheath is called as
(a) colony (b) mycelium
(c) trichome (d) hyphae
BHU PMT (Mains)-2010

Ans. (c) : The single filament of Nostoc without mucilage sheath is known as trichome.
Mycelium– The network of hyphae is known as mycelium.
Hyphae– Filaments are fine tubular highly branched is called hyphae.
Colony– A group of bacteria , fungi and other organism in solid, agar plate is known as colony.

158. Cyanobacteria are:
(a) Mosses which attack bacteria
(b) Bacteria which attack Cyanophyccae
(c) Autotrophic organism with phycocyanin
(d) None of these
BVP-2004

Ans. (c) : Cyanobacteria commonly known as **blue green algae.** Cyanobacteria are autotrophic and synthesized their food from photosynthesis. These are oxygenic organism which evolved O_2 in photosynthesis and oxidizing atmosphere. Main pigment phycobilins are of two types Phycocyanin and Phycoerythrin along with chlorophyll a.

159. Which of first photosynthetic organism?
(a) Green algae (b) Red algae
(c) Cyanobacteria (d) None of these
BVP-2004

Ans. (c) : Cyanobacteria– These are oxygenic organism which evolved O_2 in presence of photosynthesis and oxidizing atmosphere, which consist of C. phycocyanin

160. An auxotroph is:
(a) a plant that responds by vending towards sun
(b) an organism that depends on another organism for meeting its nutritional requirements
(c) a mutant which has lost its ability to synthesize one or more essential compounds
(d) a plant that is able to synthesize its own carbohydrate
BVP-2005

Ans. (c) : Auxotroph:– It is a mutant which has lost its ability to synthesize and are more essential compound. Auxotrophy, to increase is the inability of an organism to synthesized a particular organic compound required it's growth.

161. Heterothallism was discovered in :
(a) Mucor (b) Aspergillus
(c) Agaricus (d) Albugo
BVP-2002

Ans. (a) : Heterothallism, was discovered by Blakeslee (1904) in *Mucor mucedo*. Heterothallism is a condition similar to dioecious plants in which two complementary individuals are required for sexual reproduction but are morphologically different.

162. Bacterial toxins when excreted into the surrounding medium are known as :
(a) toxins (b) endotoxins
(c) exotoxins (d) both [b]and [c]
Uttarakhand PMT-2006

Ans. (c) : Exotoxins:– Exotoxins are usually heat labile proteins secreted by certain species of bacteria which diffuse into the surrounding medium. An exotoxin can cause to damage to the host by destroying cells or by disrupting normal cellular metabolism. Pathogenic bacteria that produce exotoxin mainly include *Clostiridium tetani, Clostridium botulinum, Vibrio cholera.*

163. Sexual reproduction is absent in:
(a) Volvox (b) Spirogyra
(c) Nostoc (d) Ulothrix
BVP-2001

Ans. (c) : Sexual reproduction absent in Nostoc. It reproduces vegetatively by the fragmentation hormogonia, akinetes and heterocyst.
• By fragmentation- Filament broken into segment called the fragment. Each fragment after the growth forms new plant.
• Akinetes are formed during the unfavorable condition.

164. Choose the wrong statements regarding bacterial cell
A. Glycocalyx is the outer most envelope in bacteria.
B. The glycocalyx could be a loose sheath called capsule
C. The glycocalyx may be thick and tough called slime layer
D. A special structure formed by the plasma membrane is called mesosome
E. Small bristle like fibres sprouting out of the cell are called fimbriae
(a) A and C are wrong (b) A and B are wrong
(c) B and C are wrong (d) A and D are wrong
(e) C and D are wrong
Kerala PMT-2012

Ans. (c) : Glycocalyx:– It is outer most covering layer of bacteria. It is thick and tough layer called the **capsule.** Such bacteria are called capsulated bacteria. Mostly pathogenic, made up polypeptide and polysaccharide consist of mucilage which retains the water and protect the cell dehydration also help stick on the substances. If glycocalyx is slippery and loose called the slime layer consisting of polysaccharide.

165. Beggiatoa is a
(a) Chemoheterotroph (b) Chemoautotroph
(c) Photoautotroph (d) Photoheterotroph
AP EAMCET-2014

@apna_pdf

Ans. (b) : Beggiatoa is a species of filamentous colourless proteobacteria. It is present in sulphur rich environment. This is a chemoautotroph that is a symbiotic sulfur-oxidizing bacteria.

166. Identify the pair of wrong statements in the following

(i) Intine of pollen grain is made up of sporopollenin

(ii) Pollen grains are well preserved as fossils because of the presence of sporopollenin.

(iii) Enzymes each degrade the organic material of the exine of pollen grain.

(iv) Sporopollenin can withstand high temperatures, strong acids and alkali

(a) (iii) and (iv) (b) (ii) and (iii)

(c) (i) and (iii) (d) (i) and (ii)

AP EAMCET-2014

Ans. (c) : Sporopollenin is a chemically inert biological polymer. It is a major component of the tough outer walls of plant spores and pollen grains. It is preserved in soil and sediments. Sporopollenin is one of the most resistant organic compound. It protects, pollen grains from external factors such as temp., acid due to the presence of sporopollenin. Pollen grain are preserved as fossils by sporopollenin.

167. The structure present in cyanobacteria (BGA) helping in nitrogen-fixation is

(a) haplosperm (b) holostrum

(c) holotrema (d) heterocyst

JCECE-2010

Ans. (d) : Cyanobacteria or blue green algae having the potential to fix atmospheric nitrogen. It is possible due to the presence of heterocyst. They have evolved multiple specialized cell types, including nitrogen fixing heterocysts.

168. Which of the following are true archaebacteria? (1) Extreme halophytes
(2) Extreme thermophiles
(3) Methanogens
(4) Presence of peptidoglycan cell wall

(a) 1, 2 and 3 are correct

(b) 1 and 2 are correct

(c) 1, 2 and 4 are correct

(d) 1 and 3 are correct

BHU PMT (Mains)-2006,2008

Ans. (a) : It is unicellular. Prokaryotic organism, the cell wall consist of complex proteins and complex non cellulosic polysaccharide but peptidoglycan is absent in cell wall.

- The cell membrane made up of branched chain of lipid, due to the presence of lipid chains, they are resistant to high temperature, salinity, radiation and change of pH is tolerance of unfavorable condition methanogenes.

169. Plasmid found in bacteria and used as vectors in molecular biology/biotechnology work. These genetic element of bacteria are

(a) Chromosomal (b) extra-chromosomal

(c) mitochondrial (d) none of these

AMU-1995

Ans. (b) : Plasmids are genetic element of DNA molecule in the form of extra-chromosomal segment discovered by-Lederberg in 1952. It is smaller than nucleoid.

170. Prokaryotes have

(a) large nuclei (b) single large nucleus

(c) large and small nuclei (d) no defined nucleus.

AMU-1995

Ans. (d) : Prokaryotes are organism whose cell lack a nucleus and other organelles like membrane bounded organelles as Mitochondria, Golgi body, Endoplasmic reticulum. It is unicellular organism which has incipient nucleus and 70 S type of Ribosomes.

171. When there is bunch of flagella on one side, the bacteria are known as

(a) lophotrichous (b) amphitrichous

(c) peritrichous (d) none of these

AMU-1995

Ans. (a) : When a group of flagella is present at an end only is called **lophotrichous** Eg- *Spirillum volutans.*

Lophatricous

172. Assertion (A) : Bacteria have three basic shapes, i.e. round, rod, spiral.
Reason (R) : Cocci and bacilli may form clusters or chain of a definite length,

(A) If both the (A) and the (R) are true and the (R) is a correct explanation of the (A).

(B) If both the (A) and the (R) are true but the (R) is not a correct explanation of the (A).

(C) If the (A) is true but (R) is false.

(D) If both the (A) and the (R) are false.

(E) If (A) is false but (R) is true

(a) A (b) B

(c) C (d) D

(e) E

AIIMS-2000

Ans. (b) : Bacteria have four basic shapes
(1) Rounded or coccus- eg *Micrococcus agilis*
(2) Rod shaped or bacillus- eg *Lactobacillus, E. Coli.*
(3) Commo shaped or vibria - *Vibrio cholerae*
(4) Spiral shaped or spirillum- *Spirillum volutans.*

173. Methanogens belong to

(a) eubacteria (b) archaebacteria

(c) dinoflagellates (d) slime moulds

NEET-2016 Phase-II

Ans. (b) : The archaebacteria that produce methane as a metabolic by product are called **Methanogens** e.g. Methane producing genera are *Methanobacterium, Methanococcus, Methanospirillum* etc.

- Archaebacteria are a group of most primitive prokaryotes which are believed to have evolved immediately after the evolution of first life.
- They are autotrophs and derive their energy from oxidation of chemical energy sources such as ammonia and methane etc.

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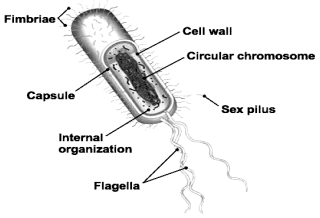
174. The structures that help some bacteria to attach to rocks and/or host tissues are :

(a) Holdfast (b) Rhizoids
(c) Fimbriae (d) Mesosomes

AIPMT (Re-Exam)-2015

Ans. (c) : Fimbriae and pili are thin, protein tubes originated from the cytoplasmic membrane of many bacteria. It help to stick the bacteria to the surface.
Fimbriae help to adhere to animal cells and some inanimate objects.
• The main difference between fimbriae and pili is that fimbriae are responsible for the attachment of the cell to its substrate whereas pili are responsible for the attachment and horizontal gene transfer during bacterial conjugation.

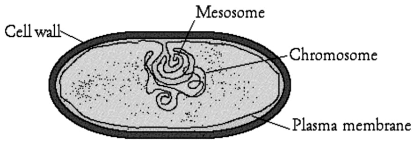


175. Which structures perform the function of mitochondria in bacteria?

(a) Nucleoid (b) Ribosomes
(c) Cell wall (d) Mesosomes

AIPMT-2014

Ans. (d) : Mesosomes are found in the membranes of bacterial cells. These are organelles formed by plasma membrane infoldings. It increases the surface area of the plasma membrane to carry out various enzymatic activities and also helps in secretion process as well as in bacterial respiration.



176. Pigment-containing membranous extensions in some cyanobacteria are:

(a) Chromatophores (b) Heterocysts
(c) Basal bodies (d) Pneumatophores

NEET-2013

Ans. (a) : Cyanobacteria have chromatophores a unique compartment in their cytoplasm. Amphibians, Fish, Reptiles, and Cephalopods all have chromatophore, which are pigment containing and light reflecting cells.

177. Besides paddy fields, cyanobacteria are also found inside vegetative part of:

(a) Psilotum (b) Pinus
(c) Cycas (d) Equisetum

NEET-2013

Ans. (c) : Cycas are considered ancient plants. They are palm-like trees. The trunk of the plant is columnar and aerial in nature. The roots show negative geotropism. So, these are called **coralloid roots** that have nitrogen-fixing bacteria. Also, these roots are photosynthetic due to the presence of photosynthetic bacteria. This property is due to the presence of cyanobacteria.

178. Barophilic prokaryotes –

(a) Grow slowly in highly alkaline frozen lakes at high altitudes
(b) Grow and multiply in very deep marine sediments
(c) Readily grow and divide in sea water enriched in any soluble salt of barium
(d) Occur in water containing high concentrations of barium hydroxide

AIPMT-2005

Ans. (b) : Barophilic prokaryotes, also known as barophile, is a type of organism which can grow and exists at high pressure zone. e.g. deep sea bacteria and archaebacteria. They can grow and multiply is very deep sea sediments.

179. How many organisms in the list given below are autotrophs
Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Saccharomyces, Trypanosoma, Porphyra, Wolfia

(a) Six (b) Three
(c) Four (d) Five

AIPMT (Mains)-2012

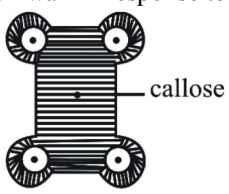
Ans. (a) : An autotrophs is an organism that can make its food from light, water, carbon dioxide or other substances. Form the list autotrophs include a total of six as **Chara, Nostoc, Porphyra, Wolfia, Nitrosomonas, Nitrobacter,** Of these **Chara, Nostoc, Porphyra, Wolfia** is photoautotrophs while **Nitrosomonas, Nitrobacter** are chemoautotrophs.

180. In Angiosperm all the four microspores of tetrad are covered by a layer which is formed by : -

(a) Pectocellulose (b) Callose
(c) Cellulose (d) Sporopollenin

AIPMT-2002

Ans. (b) : The callose plays an important role in different stages of development of plants. It is a plant polysaccharide which is produced to act as a temporary cell wall in response to stimuli such as stress or damage.



Microspore tetrad
(means 4 microspore)

181. Transduction in bacteria is mediated by:

(a) plasmid vectors (b) phage vectors
(c) cosmids (d) F-factors

AIPMT-1994

Ans. (b) : Transduction is the process by which a virus transfers genetic material from one bacterium to another.
• Bacteriophage mediate horizontal gene transfer through a mechanism known as transduction, therefore, transduction in bacteria is mediated by phage vector.

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182. Genophore/bacterial genome or nucleoid is made of:
(a) histones and non-histones
(b) RNA and histones
(c) a single double stranded DNA
(d) a single stranded DNA

AIPMT-1993

Ans. (c) : Genophores refers to the corresponding chromosome in prokaryotes, viruses, and semi-autonomous organelles that function as inherited material. It is made up of nucleic acid, DNA or RNA but has no histone proteins.
Thus, the genophores/ bacterial genome or nucleoid is made of a single double stranded DNA.

183. Bacteria lack alternation of generation because there is:
(a) neither syngamy nor reduction division
(b) distinct chromosomes are absent
(c) no conjugation
(d) no exchange of genetic material

AIPMT-1992, 1991

Ans. (a) : Syngamy and meiotic division take place during sexual reproduction, but since bacteria do not create gametes, therefore, no syngamy or reduction division occur in bacteria. So, they do not have alternation of generation.

184. Which one belongs to Monera?
(a) Amoeba (b) Escherichia
(c) Gelidium (d) Spirogyra

AIPMT-1990

Ans. (b) : *Escherichia coli* is the bacteria belongs to the kingdom of Monera. *Escherichia coli* is a unicellular, prokaryotic bacteria.

185. Organisms, which fix atmospheric nitrogen in the soil, fall under the category of:
(a) bacteria (b) green algae
(c) soil fungi (d) mosses

AIPMT-1994

Ans. (a) : Microscopic single- celled organisms lacking a distinct nucleus are known as bacteria.
• Organisms which fix atmospheric nitrogen in the soil are come under bacteria because they are only prokaryotic organism who have certain enzymes.

186. A large number of organic compounds can be decomposed by:
(a) Azotobacter (b) Chemolithotrophs
(c) Mycoplasma (d) Pseudomonas.

AIPMT-1995

Ans. (b) : Chemolithotrophs:– A cell's acquisition of energy from the oxidation of inorganic compounds, also known as electron donors. It can drive the energy required for growth from the oxidation of inorganic components.
Thus, a large number of organic compounds can be decomposed by chemolithotrophs.

187. What are the sex organs provided in some bacteria?
(a) Sex pili (b) Plasmid
(c) Circular DNA (d) Gametes

AIPMT-1996

Ans. (a) Sex pili are tiny, non flagellar hair- like structure that are present on Gram negative bacteria and a few Gram positive bacteria have on their walls. During conjugation, they serve as sex organs and create the conjugation tube.
Therefore, the sex organs provided in some bacteria are sex pili.

188. Azotobacter and *Bacillus polymyxa* are the examples of:
(a) pathogenic bacteria
(b) decomposers
(c) symbiotic N_2 fixer
(d) non-symbiotic N_2 fixer

AIPMT-1996

Ans. (d) : Azotobacter and *Bacillus polymyxa* are the examples of non-symbiotic N_2 fixers.
• Azotobacter is aerobic because it can strictly live only in the presence of oxygen.
• *Bacillus polymyxa*, is a gram-positive bacterium capable of fixing nitrogen.
• *Rhizobium* is an example for symbiotic nitrogen fixer.

189. The hereditary material present in the bacterium E.coli is:
(a) single-stranded DNA
(b) double-stranded DNA
(c) DNA
(d) RNA

AIPMT-1997

Ans. (b) : The hereditary material present in the bacterium E. coli is double-stranded DNA. The DNA is not linked with any histone proteins so it is referred to as naked DNA.

190. Assign the following substances to the cell wall, flagella, 's' layer and pili of bacteria in correct sequence
i. Glycoprotein ii. Fimbrin/Pilin
iii. Teichoic acid iv. Flagellin
The correct sequence is
(a) iii, i, iv, ii (b) iii, iv, i, ii
(c) ii, iv, iii, i (d) iii, iv, ii, i

AP EAMCET-2008

Ans. (b) : The cell wall component of a Gram-positive bacteria is teichoic acids which is linked to N-acetylmuramic acid or terminal D-alanine in the cross-linkage between N-acetylmuramic acid units of the peptidoglycan layer.
• The bacterial flagellum is made up of the protein flagellin. The S-layer is also known as surface layer which is a part of the cell envelop of bacterial. It is composed of glycoproteins whereas pilli is a hair-like appendage which is composed of pilin protein also known as fimbrin.

191. In bacteria respiration occurs in
(a) cytoplasmic membrane
(b) mitochondria
(c) nuclear membrane
(d) endoplasmic reticulum

JIPMER-2005

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Ans. (a) : In bacteria respiration occurs in cytoplasmic membrane. Cytoplasmic membrane has folded invagination's called mesosomes. It increases the surface area required for cellular respiration. They are the site of respiration as they contain respiratory enzymes.

192. Water bloom is generally caused by

(a) green algae (b) blue green algae
(c) bacteria (d) Hydrilla

JIPMER-2008
BHU PMT (Screening)-2007
BVP-2004

Ans. (b) : Water bloom is caused by rapid increase in the population of algae which leads to the changes in the colour of water body. Blue-green algae, also called cyanobacteria, any of a large, heterogenous group of prokaryotic, principally photosynthetic organisms. Cyanobacteria range in size from 0.5 to 60 micrometers, which represents the largest prokaryotic organism.

193. Genes are packaged into a bacterial chromosome by

(a) Acidic protein (b) Actin
(c) Histones (d) Basic protein

AIPMT-1997

Ans. (d) : Bacterial chromosome are present in a nucleoid, a distinct cytoplasmic structure, in which double-stranded DNA. Genes are packed into a bacterial chromosome by basic protein.

• The bacterial chromosome is having circular DNA containing the entire genome within it.

194. Photosynthetic bacteria have

(a) pigment system I
(b) pigment system II
(c) Both (a) and (b)
(d) some other kind of pigments, B_{890}

AIIMS-2011

Ans. (c) : Cyanobacteria contain two type of photosystem namely, type I, also known as Fe-S type and type II also known as quinone type and carry out oxygen-evolving photosynthesis. The other four group of photosynthetic bacteria contain only one type of photosystem which perform non-oxygen evolving photosynthesis.

195. Photosynthetic bacteria do not contain

(a) Quantasome (b) PS-I and PS-II
(c) PS - II (d) PS- I

AIIMS-2001

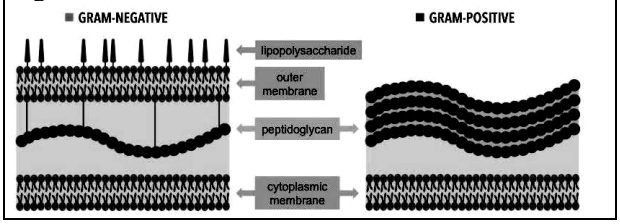
Ans. (c) : Since, there are only two photosystems, PS-I and PS-II, photosynthetic bacteria can only carry out cyclic photophosphorylation because they have only PS-I, which uses H_2S as an electron donor rather than water and results is no oxygen produced.

196. Some Gram-ve bacteria have peptidoglycan and an extra layer of

(a) Lipo-polysaccharide (b) Lipo-protein
(c) Protein (d) Both (a) and (c)

AIIMS-2001

Ans. (a) : The Gram-negative bacteria are surrounded by a thin peptidoglycan cell wall, which is covered surrounded by an outer membrane containing lipopoly saccharide, where as Gram -positive bacteria lack an outer membrane but are surrounded by many layers of peptidoglycan and is thicker than is found in the gram - negative.



197. The site of respiration in bacteria is:

(a) Ribosome (b) Microsome
(c) Episome (d) Mesosome

AIPMT-1997

Ans. (d) : The mesosomes are membrane bound organelles that are produced by the plasma membrane and they lie close to the cell membrane. They are also referred to as the chondrin. They are known to play a role in the respiration bacterial cell. In bacteria, the process of respiration is performed in mesosomes.

198. Bacteria with single flagella at one end is called :

(a) monotrichous (b) lophotrichous
(c) amphitrichous (d) peritrichous

Punjab MET-2006

Ans. (a) : Monotrichous bacteria:– When a single flagella is present at one end bacteria is called monotrichous. eg *Pseudomans, Vibrio cholerea.*

199. Which of the following is a prokaryote?

(a) Nostoc (b) Protozoa
(c) Prosopis (d) Chlorella

J&K CET-2000

Ans. (a) : Nostoc:– It is prokaryote unicellular, autotrophic organism. Cell wall made up of nucleopeptide and cell membrane made of lipoprotein.

200. Maximum number of antibiotics are obtained from:

(a) fungi (b) bacteria
(c) virus (d) plants

AFMC-2003

Ans. (b) : The maximum number of antibiotics are obtained form bacteria which are following-

Bacteria		Antibiotics
Bacillus subtilis	-	Subtilisin
Bacillus brevis	-	Gramicidin
Streptomyces venezuelae	-	Chloramphenicol
Streptomyces griseus	-	Streptomycin
Streptomyces fradae	-	Neomycin
Streptomyces rimosus	-	Terramycin

201. Substances secreted by bacteria are:

(a) proteins (b) toxins
(c) inter ferons (d) antibiotics

AFMC-2003

Ans. (b) : Some pathogenic bacteria destroy the cells of the host, but most cause disease because they produce poisonous substances that damage the host metabolism.

• These substances are called toxins. Bacterial toxins may be divided into two classes - (i) endotoxins, are

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liposaccharides in the cell wall of gram negative bacteria they produce fever and damage to circulatory system, (ii) Exotoxins are much less common than endotoxins they are proteins and are secreted from the bacterium into the surrounding medium. They may be carried by the host body in the blood in the bacteria causing diphtheria, tetanus, cholera etc produce exotoxins.

202. Splenic fever occurs in cattles, goats, camel and sheep etc, and is caused by
(a) *Corynebacterium pyogenes*
(b) *Cowpox virus*
(c) *Klebsiella pneumoniae*
(d) *Bacillus anthracis*

BCECE-2015

Ans. (d) : Splenic fever occurs in cattles, goats, camel and sheep etc and its caused by *Bacillus anthracis*. It is a Gram-positive and rod-shaped bacterium that is occasionally pathogenic to humans.

203. Incubation period of Treponema pallidum is about
(a) 2 to 14 days (b) 7 to 21 days
(c) 1 to 2 weeks (d) 3 to 4 weeks

MHT CET-2016

Ans. (d) : The bacterium *Treponema pallidum* causes syphilis. Syphilis is a type of sexually transmitted disease. The Incubation period of *Treponema pallidum* is about 3 to 4 weeks.

204. Which of the following is a BGA ?
(a) Anabaena (b) Rhizobium
(c) Clostridium (d) Azotobacter

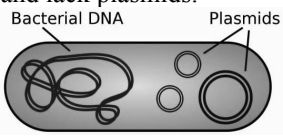
MHT CET-2010

Ans. (a) : Anabena is a blue green algae reside in pond river lake etc. *Anabaena azollae* is found in pockets on the leaves of Azolla and helps in converting N_2 to NH_4 by nitrogen fixation. It increases the productivity of rice paddies.

205. Extra chromosomal circular DNA is found in
(a) Virus (b) Bacteria
(c) Protozoa (d) Algae

MHT CET-2008

Ans. (b) : Circular DNA is found as extrachromosomal plasmid DNA in bacteria . This confers antibiotic resistance to the cell. Plant and animals are eukaryotes and lack plasmids.



206. The structure formed by bacterial genome is called:
(a) nucleoside (b) nucleoside
(c) nucleoid (d) nucleus

Rajasthan PMT-1997
JIPMER-1996

Ans. (c) : The structure formed by bacterial genome is called nucleoid, or genophore or incipient nucleus. In the central part, true nucleus is absent, nuclear membrane absent and histone protein absent called nucleoid. Nucleoid consists of naked single as circular DNA true chromosome absent.

207. A plasmid is made up of.
(a) f-RNA (b) m-RNA
(c) r-RNA (d) DNA

JIPMER-2002

Ans. (d) : A small circular DNA molecule found in bacteria and same other microscopic organism are called **plasmids**. Plasmids are physically separated from chromosomal DNA and replicate independently.

208. An organisms having cytoplasm, DNA and RNA but no cell wall is
(a) cyanobacterium (b) mycoplasma
(c) bacterium (d) virus

CG PMT-2005

Ans. (b) : Mycoplasma is the unicellular, smallest prokaryotes organism. Cell wall is absent and having cytoplasm, DNA, RNA, and cell membrane. Cell membrane made up of lipoproteins. Mesosomes are absent in mycoplasma.

209. How many basal body rings are present in gram positive cells?
(a) 3 (b) 2
(c) 4 (d) 5

BCECE-2015

Ans. (b) : Basal body is also known as basal granule. The basal body is embedded outside the cytoplasm under the plasma. Gram- positive organism have two basal body rings, one in peptidoglycan layer and one is in the plasma membrane.

210. Which one of the following is also called halophiles?
(a) Eubacteria (b) Actinomycetes
(c) Archaebacteria (d) Cyanobacteria

WB JEE-2007

Ans. (c) : Salt lovers archebacteria or halophiles, these are also known as anaerobic bacteria, which occurs in extreme saline or salty conditions (upto 35% of salt or NaCl in culture medium) a purple pigmented membrane containing bacterio rhodopsin is developed in sunlight, these bacteria utilizes light energy for metabolic activities.

211. Which one of the following is not a bacteria ?
(a) Pseudomonas (b) Clostridium
(c) Actinomycetes (d) Azotobacter

MGIMS Wardha-2015

Ans. (c) : Actinomycetes, these are filamentous bacteria (like moulds or fungi). These are generally present as decomposers in soil. They reproduce sexually by means of conidia produced at tip of filaments. These secretes antibiotics, such as *Streptomyctes secretes* streptomycin, neomycin etc.

212. Organisms found in extreme temperature are:
(a) cyanobacteria (b) archaebacteria
(c) fungi (d) eubacteria

DUMET-2002

Ans. (b) : Archaebacteria are the primitive group of organism, unicellular and prokaryotic organism the cell wall consist of complex proteins and complex non cellulosic polysaccharides. But peptidoglycan absent the cell membrane is made up of branched chain of lipid, due to branched lipid chain they are resistant to high temperature, salinity, radiation, change of pH.

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213. In ruminants cellulose digestion takes place by:
(a) bacteria (b) protozoans
(c) virus (d) both (a) and (b)

DUMET-2002

Ans. (d) : In Ruminants, cellulose digestion takes place by bacteria and protozoa. Cellular digestion in ruminants like cattle occurs in the rumen of foregut that harbors bacteria that bring about breakdown of cellulose through fermentation.

214. Bacteria do not have :
(a) ribosome
(b) protein synthesizing apparatus
(c) mitochondria
(d) cell wall

BVP-2008
DUMET-2005

Ans. (c) : Bacteria are prokaryotic and unicellular organism. They do not have a membrane, bounded nucleus and other organelles like mitochondria, golgi bodies, endoplasmic reticulum and chloroplast. They have mesosome 70S type of ribosome and, RNA. The cell wall of bacteria is made up of peptidoglycan or mucopeptide or murein.

215. Spirochaetes is are
(a) a class of insects (b) a class of viruses
(c) bacteria (d) fungi

DUMET-2011

Ans. (c) : A spirochaete or spirochete is a member of phylum Spirochaetota which contains distinctive form of Gram-negative bacteria most of which have long, helically coiled cells. Spirochaetes are chemoheterotrophic in nature.

216. How many linear DNA fragments will be produced when a circular plasmid is digested with a restriction enzyme having 3 sites?
(a) 4 (b) 5
(c) 3 (d) 2

KVPY SB & SX-2014

Ans. (a) : When the plasmid contain 3 recognition sequences for a given restriction endonuclease, 4 linear DNA fragment are produced because circular DNA produces N-recognition sequences for the same restriction endonuclease whereas linear DNA produces (N + 1) fragments.

217. A bacterial colony is produced from
(a) a single bacterium by its repetitive division
(b) multiple bacterium without replication.
(c) clumping of two to three bacteria
(d) a single bacterium without cell division

KVPY SB & SX-2014

Ans. (a) : A single bacterium divides to become a visible collection called a colony, which denotes how bacteria can be grow on a nutritional medium. Clone refers to each cell in a bacterial colony.

218. Monera possess:
(a) Membrane bound nucleoproteins lying free in the cytoplasm.
(b) Gene containing nucleoproteins condensed together in compact masses.
(c) Nucleoproteins in direct contact with the rest of the cell substance.
(d) Only free nucleic acid aggregates.

MP PMT-2013

Ans. (c) : Monera possess nucleoproteins in direct contact with the rest of the cell substances. It is prokaryotic unicellular organism. They contain 70S ribosomes naked DNA and is not bounded by a nuclear membrane. It lacks organelles, like mitochondria, lysosome, golgi bodies endoplasmic reticulum and centromere.

219. Which of the following are not eukaryotes?
(a) Monera (b) Protista
(c) Animals (d) Plants

AMU-2014

Ans. (a) : Monera:– It is unicellular prokaryotes. It is composed of single celled organism that lack a nucleus.
Protista- It is unicellular eukaryotes.
Animal and Plants– Multicellular and eukaryotic.

220. In purple and green bacteria, oxygen is not evolved during photosynthesis because hydrogen donor is
(a) H_2O (b) H_2S
(c) NH_3 (d) CH_4

AMU-2014

Ans. (b) : In purple and green bacteria oxygen is not evolved during photosynthesis because H_2S serves as a hydrogen donor in purple and green sulphur bacteria.

221. The plasma membrane of mycoplasma is rich in
(a) cellulose (b) cholesterol
(c) myosin (d) glycogen

Punjab MET-2011

Ans. (b) : Mycoplasma belongs to the genus bacteria that has a plasma membrane that is rich in cholestrol and includes a significant quantity of fatty acids but lacks a cell wall around its cell membrane.

222. The characteristic of blue-green algae is :
(a) DNA without histone
(b) nuclear membrane absent
(c) 70s ribosomes
(d) all of the above

Rajasthan PMT-2002
JCECE-2003

Ans. (d) : Blue green algae or Cynobacteria is a unicellular, prokaryotic organism. It does not have well defined nucleus. The DNA is not present inside the nucleus (means the DNA is naked) rather it is present into each cytoplasm (not enclosed by the nuclear membrane) DNA has no histone protein. It consists of 70 S ribosome.

223. Gram negative bacteria are resistant due to presence of
(a) teichoic acid (b) lipopolysaccharides
(c) chitin (d) cellulose

UP CPMT-2012

Ans. (b) : In gram negative bacteria out side of the peptidoglycan other layer is lipopolysaccharide due to which Gram negative bacteria are resistant to antibiotic.
• Teichoic acid present in Gram-positive bacteria.

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224. Match the following and choose the correct combination from the options given below:

Column A	Column B
(A) Eubacteria	(I) Trichoderma
(B) Dinoflagellates	(II) Albugo
(C) Phycomycetes	(III) Gonyaulax
(D) Deuteromycetes	(IV) Anabaena

	A	B	C	D
(a)	(I)	(II)	(III)	(VI)
(b)	(II)	(III)	(IV)	(I)
(c)	(IV)	(III)	(II)	(I)
(d)	(IV)	(III)	(I)	(II)

AP EAMCET-2015

Ans. (c) :	
(A) Eubacteria	(IV) Anabaena
(B) Dinoflagellates	(III) Gonyaulax
(C) Phycomycetes	(II) Albugo
(D) Deuteromycetes	(I) Trichoderma

225. The organism which completely lack a cell wall and can live without oxygen are

(a) Archaebacteria (b) Thermoacidophiles
(c) Mycoplasmas (d) Methanogens

Karnataka CET-2015

Ans. (c) : Mycoplamsma, it is unicellular smallest prokaryotic cell. Cell wall absent and cell membrane made up of lipoprotiens. Cell organelles are absent like mitochondria, golgibodies, endoplasmic reticulum, lysosome and mesosomes.

226. Linkage group in E. coli is/are

(a) 4 (b) 2
(c) 1 (d) 5

DUMET-2007

Ans. (c) : E. coli contains single chromosome so, the number of linkage group in E. coli is 1.

227. The structure of E. coil chromosomal DNA is

(a) Double – stranded, right handed and circular
(b) Single – stranded, right handed and circular
(c) Double – stranded, left handed and linear
(d) Double – stranded, left handed and circular

WB JEE-2014

Ans. (a) : The structure of E. coli chromosomal DNA is double stranded, right-handed and circular. A double stranded DNA molecule is made up of two strands of DNA, running in opposite or in antiparallel direction.

228. Which of the following processes was discovered by Lederberg and Tatum (1946)?

(a) Transduction (b) Transformation
(c) Asexual reproduction (d) Conjugation

WB JEE-2014

Ans. (d) : Conjugation - Discovered by Lederberg and Tatum 1946 in E. coli bacterium

- Transduction- Discover by Zinder and Lederberg (1952) in *Salmonella typhi* bacterium.
- Transformation- Discovered by Griffith (1928) in Diplococcus pneumonia and detailed work out by MacLeod and McCarty.

229. The component of bacteria that retains the crystal violet stain during Gram staining is

(a) O - antigen
(b) Lipopolysaccharide
(c) Peptidoglycan
(d) Cytoplasmic membrane

WB JEE-2014

Ans. (c) : The component of bacteria that retains the crystal violet stain during Gram staining is petidoglycan, thick in Gram positive bacteria 70-80% but in Gram negative bacteria thin 10 -20% single layer.
- In Gram positive bacteria blue violet colour retained after washing with blue violet colour returned after washing with alcohol, but in Gram negative bacteria colour is washed.

230. Which of the following bacteria is observed as chain - like formation?

(a) *Escherichia coli*
(b) *Bacillus subtilis*
(c) *Streptococcus pyogenes*
(d) *Micrococcus flavus*

WB JEE-2014

Ans. (c) : *Streptococcus pyogenes* is a species of Gram positive aerotolerant bacteria in the Genus Streptococcus. These are extracellular and made up of non-motile and non - sporing cocci that tend to link in chains.

231. Chromosomes in a bacterial cell can be 1-3 in number and

(a) are always circular
(b) are always linear
(c) can be either circular or linear, but never both within the same cell
(d) can be circular as well as linear within the same cell

BVP-2008

Ans. (a) : Single double stranded circular DNA molecule can be found in the majority of bacterial cells.
- They are capable of possessing multiple chromosomes, which was initially seen in the Gram negative bacterium *Rhodobacter*.

232. Bacteria are considered plant because they:

(a) Are green in colour
(b) Have rigid cell wall
(c) Have chlorophyll
(d) Have stomata

JIPMER-2010
BHU PMT (Mains)-2008
BHU PMT (Screening)-2005

Ans. (b) : Bacteria are considered plant because they have rigid cell wall and they were classified as plants in the traditional classification system. This is due to the presence of cellulose-based cell walls in them. Bacteria like plants can produce their own food through the photosynthesis process but not all bacteria can do, and they also have a cell wall like plant cells.

233. The mode of asexual reproduction in bacteria are

(1) formation of gametes
(2) endospore formation
(3) conjugation
(4) zoospores formation

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(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (c) : Asexual reproduction in bacteria following types-
By Endospore- It forms during unfavorable condition, it is single form resistant against antibiotics high temperature, chemicals and radiation.
(ii) By Zoospore - Motile spores are formed in rhizobium bacteria but rare in other bacteria .
(iii) By Conidia- In filamentous bacteria sexual reproduction occurs by conidia as Streptomyces.

234. The bacterium (*Clostridium botulinum*) that causes botulism is
(a) a facultative anaerobe
(b) an obligate anaerobe
(c) a facultative aerobe
(d) an obligate aerobe

BCECE-2013
BHU PMT (Mains)-2010
AIPMT-2006

Ans. (b) : The bacterium *Clostridium botulinum* is the rod-shaped Gram positive bacteria, which causes the disease botulism. *Clostridium botulinum* is an obligate anaerobic bacteria. They always live in absence of O_2 in presence of O_2 they can not live.

235. Which of the following is not characteristic of gram positive bacteria?
(a) Cell wall is smooth
(b) Mesosomes are distinctive prominent
(c) Basal body of flagellum contains two rings
(d) Murein content of cell wall is 70-80%

BCECE-2012

Ans. (b) : Gram positive bacteria have basal body of flagellum contains two ring. It lack outer membrane layer which is found in Gram negative bacteria.
Gram - positive bacteria are bacteria that give a positive result in the gram stain test. Most Gram- positive bacteria have a relatively thick continuous cell wall which is composed largely of peptidoglycan (also known as mucopeptide or murein)

236. The bacterial genome contains
(a) DNA and histone
(b) DNA or histone
(c) DNA without histone
(d) Neither DNA nor histone

CG PMT-2004

Ans. (c) : The bacterial genome consist of a single circular double stranded DNA molecule without histone proteins.

237. The smallest free-living organism is
(a) virus (b) mycoplasma
(c) cyanobacteria (d) bacteria

CG PMT-2004

Ans. (b) : The smallest free living organism is mycoplasma. It is unicellular smallest prokaryotic organism ranges from 0.1μ to 00.3μ, which is capable for independent growth reproduction and metabolism also called **PPLO** (pleura pneumonia like organism). Cell wall absent exhibit polymorphism called "Joker of plant kingdom".

238. The sexuality in bacteria was established by
(a) Lederberg and Tatum
(b) H J Muller
(c) Hargobind Khorana
(d) Ochoa and Kornberg

CG PMT-2004

Ans. (a) : The sexuality in bacteria was discovered by Lederberg and Tatum (1946). E. coli bacterium in this process gene transfer from one cell to other cell by physical contact called the conjugation.

239. Cell wall is extremely well preserved in fossil specimen in
(a) diatoms (b) dinoflagellates
(c) slimemoulds (d) None of these

BVP-2011

Ans. (a) : Diatoms may be either unicellular or colonial the diatoms are important components of marine and fresh water habitats. The cells are normally protected by a wall called a frustules, made up of silica and surrounded by mucilage.

240. Some bacteria are not easily killed by antibiotics or heat treatment because of their
(a) Capsule
(b) Chitinous cell wall
(c) Mucopeptides in cell wall
(d) Mesosomes

CMC Vellore-2011

Ans. (a) : Some bacteria are not easily killed by antibiotics and heat treatment because their capsule and mucopeptide cell wall is present. The gram positive bacteria produce endospores during the unfavorable condition. Endospore are tough and resistant structure which remains undamaged during stressful condition.

241. Which one of the following is denitrifying bacteria?
(a) Nitrosomonas (b) Pseudomonas
(c) Azotobacter (d) Nostoc

J&K CET-2011

Ans. (b) : The process of conversion of nitrate into nitrogen is known as denitrification. Denitrification is carried out by the denitrifying bacteria such as Pseudomonas.

242. Plague (black death) is caused by.
(a) bacteria (b) virus
(c) protozoan (d) fungi

Haryana PMT-2000

Ans. (a) : Plague is an infectious disease that affect animals and humans. It is caused by the bacterium *Yersinia pestis*. This bacterium is found in rodents and their fleas occurs in many areas of the world including the United States. *Yersinia pestis* is easily destroyed by sunlight and drying.

243. The Gram (-) bacteria detect and respond to the chemicals in their surroundings by
(a) Muramic acid
(b) Lipopolysaccharide

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(c) Volutin granules
(d) Porin

WB JEE-2008

Ans. (d) : The Gram-negative bacteria detect and respond to the chemicals in their surroundings by porin.
• They are involved in the exchange of nutrients over the outer membrane of Gram-negative bacteria but are also involved in pathogenesis.

244. Which of these components is/are not present in Gram-negative bacteria?
(a) Teichoic acid
(b) Pseudomurein
(c) Lipopolysaccharide
(d) Mycolic acid

WB JEE-2015

Ans. (a) : Teichoic acid present in gram positive bacteria and join perpendicular to the NAG and NAM.
• Teichoic acid bind the peptidoglycan layers, it is absent in Gram negative bacteria.

245. Which one of the following cocci appears like graphs under microscope?
(a) Streptococci (b) Diplococci
(c) Staphylococci (d) Pneumococcal

WB JEE-2015

Ans. (c) : Staphylococci are grape-like (irregular) clusters of cocci. It is found as a part of the normal skin flora on the nasal passage and skin and also upper respiratory tracts of birds and mammals.

246. I. Unicellular, colonial, filamentous, marine or terrestrial forms
II. The colonies are surrounded by a gelatinous sheath
III. Some can fix atmospheric nitrogen in specialized cells called heterocysts
IV. They often form blooms in water bodies
These above characters are seen in
(a) Archaebacteria (b) Cyanobacteria
(c) Chrysophytes (d) Dinoflagellates
(e) Slime moulds

Kerala PMT-2013

Ans. (b) : **Cyanobacteria :-** It is unicellular, colonial, filamentous, marine or terrestrial forms.
• The colonies are surrounded by a gelatinous sheath called **Palmelloid colony**.
• Some can fix atmospheric nitrogen in specialized cells called **Heterocysts.**
• They after form blooms are seen is *Oscillatoria, Nostoc* etc.

247. Smallest bacteria is:
(a) Spirillum (b) Bacillus
(c) Dialister (d) None of these

VMMC-2007
Rajasthan PMT-2005
UPCPMT-2002

Ans. (c) : The non-fermentative, anaerobic, Gram negative bacillus is *Dialister pneumosintes*. It was formally called *Pneumosintes bacteroides* among the organism given, it is the smallest bacterium.

248. Photosynthetic bacteria have pigments in
(a) chromoplasts (b) leucoplasts
(c) chloroplasts (d) chromatophore

Punjab MET-2010

Ans. (d) : Photosynthetic bacteria convert the water and CO_2 into the O_2 and the sugar with the help of sunlight.
• These bacteria possess the chromotophores. The pigment containing cell is present in the chromatophore.

249. Which one of the following statements is wrong
(a) Phycomycetes are also called algal -fungi
(b) Cyanobacteria are also called blue- green algae
(c) Golden algae are also called desmids
(d) Eubacteria are also called false bacteria

NEET-2016 Phase-I

Ans. (d) : Eubacteria are also called false bacteria is wrong statement. Bacteria have two domains, namely eubacteria are also called **true bacteria and archaea**
• They have rigid cells walls and flagella.
• Eubacteria are prokaryotic microorganisms consisting of a single cell lacking a nucleus and containing DNA is a single circular chromosome.

250. Which of the following is not a feature of the plasmids
(a) Single- stranded
(b) Independent replication
(c) Circular structure
(d) Transferable

NEET-2016 Phase-I

Ans. (a) : Generally **plasmids are extra chromosomal genetic material** which is present in bacteria. They are capable of independent replication. They are **circular double stranded DNA** molecule and contains some specialized genes like antibiotic resistance genes. They are transferable.
Thus, single stranded is not a features of plasmids.

251. Some hyperthermophilic organisms that grow in highly acidic (pH - 2) habitats belong to the two groups –
(a) Eubacteria and archaea
(b) Cyanobacteria and diatoms
(c) Protists and mosses
(d) Liverworts and yeasts

AIPMT (Screening)-2010

Ans. (a) : Eubacteria like BGA and Thermoacidophiles (Archaebacteria) grow in highly acidic (pH - 2) habitats.
• Archaebaceteria are called ancient bacteria where as eubacteria are called true bacteria. Unlike eubacteria, archaebacteria can survive in extreme conditions.

252. Membrane-bound organelles are absent in:
(a) Saccharomyces
(b) Streptococcus
(c) Chalamydomonas
(d) Plasmodium

AIPMT (Screening)-2010

Ans. (b) : Streptococcus belongs to kingdom Monera, it is a unicellular prokaryotic organism. They do not have membrane-bound organelles.

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253. Select the correct combination of the statements (a-d) regarding the characteristics of certain organisms.

(1) Methanogens are archaebacteria which produce methane in marshy areas
(2) Nostoc is a filamentous blue-green alga which fixes atmospheric nitrogen
(3) Chemosynthetic autotrophic bacteria synthesize cellulose form glucose
(4) Mycoplasma lack a cell wall and can survive wihout oxygen.

The correct statements are

(a) (1), (2), (4) (b) (2), (3)
(c) (1), (2), (3) (d) (2), (3), (4)

AIPMT (Mains)-2010

Ans. (a) : Methanogens :- Microorganisms that create methane as a byproduct of their metabolism, these bacteria can be found in the stomach of ruminant animal. Nostoc is a filamentous blue-green alga which fixes atmospheric nitrogen..

• Nostoc plays a important role in nitrogen fixation with the help of special type of cell called **heterocyst**.

• The mycoplasma are organism that completely lack a cell wall. They are the smallest living cell known and can survive without oxygen many mycoplasma are pathogenic in animal and plants.

254. Which type of DNA is found in bacteria?

(a) Helical DNA
(b) Membrane bound DNA
(c) Straight DNA
(d) Circular free DNA

JIPMER-2004

Ans. (d) : Circular free DNA is found in bacteria. A plasmid is a small circular DNA molecule found in bacteria and some other microscopic organisms. Plasmids are physically seperate from chromosomal DNA and replicate independently.

255. Select incorrect pair

(a) Porifera – Choanocytes
(b) Coelenterata – Nematocysts
(c) Annelida – Segmentation
(d) Monera – Eukaryote

JIPMER-2012
VMMC-2009

Ans. (d) : Kingdom Monera includes all prokaryotic organism. Bacteria are the sole membrane of kingdom Monera. They are the most abundant micro organisms . Bacteria occur almost everywhere.

256. Thermococcus, Methanococcus and Methanobacterium are groups of

(a) bacteria containing a cytoskeleton and all membrane bound organelles
(b) archaebacteria with peptidoglycan in their cell wall
(c) archaebacteria that consists of protein homologous to eukaryotic core histones
(d) most advanced type of bacteria

CMC Vellore-2015
JIPMER-2015
AIIMS-2008

Ans. (c) : Thermococcus, Methanococcus and Methanobacterium are examples of Archaebacteria, which lack the histone protein found in eukaryotes.

• Histones are of the same type and eukaryotic are similar to the archaeal ancestor of the histone family. Thermococcus, Methanococcus and Methanobacterium, whose histones are shorter than eukaryotic histones and assembled into tetramers.

257. The part of the bacterial chromosome sharing homology with genome fragment transferred from the recipients to cell during merozygote formation is known as

(a) eugenic (b) exogenate
(c) endogenate (d) dysgenic

JIPMER-2015

Ans. (c) : Bacterial chromosome which is similar or homologous to the received copy is called endogenous. The remaining part of the bacterial chromosome which is not similar is called exogenate. When the exchange of genetic material is carried out as part of the bacterial cells recombination process, the merozygote formation occurs. At this stage, the cell contains two copies of the same part of the bacterial chromosome.

258. Gas gangrene is caused by:

(a) Clostridium botulinum
(b) Xanthomonas campestris
(c) Pseudomonas
(d) Clostridium perfringens

JIPMER-2015

Ans. (d) : Gas gangrene is usually caused by a bacteria called Clostridium perfringens. Bacteria collect in an injury or surgical wound that does not have a blood supply. Bacterial infection produces toxins that release gas and cause tissue death.

259. Study the following lists :

List–I		List–II
(A)	**Epulopiscium**	**1. Vector fishelsoni**
(B)	**Bacillus thuringiensis**	**2. Acanthurus**
(C)	**Treponema pallidum**	**3. Bacitracin**
(D)	**Agrobacterium tumefaciens**	**4. Bioinsecticide**
		5. Syphilis

The correct match is

	A	B	C	D
(a)	2	4	5	1
(b)	3	1	2	4
(c)	5	2	1	3
(d)	4	2	5	3

AP EAMCET-2007

Ans. (a) :

A	B	C	D
2	4	5	1

List–I	List–II
(A) Epulopiscium	2. Acanthurus
(B) Bacillus thuringiensis	4. Bioinsecticide
(C) Treponema pallidum	5. Syphilis
(D) Agrobacterium tumefaciens	1. Vector fishelsoni

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260. The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are ones categorised as:
(a) Chemosynthetic autotrophs
(b) Heterotrophic bacteria
(c) Cyanobacteria
(d) Archaebacteria

AIPMT (Screening)-2012

Ans. (b) : Heterotrophic bacteria derive energy from organic compound. They help in nutrient recycling. They compose of dead and decaying plants and animals remnants and help in biodegradation.
- Heterotrophic bacteria are used for making curd, antibiotics, nitrogen fixation etc.

Some of the example of heterotrophic bacteria are Agrobacterium, Xanthomonas, Pseudomonas, Salmonella, Escherichia, Rhizobium etc.

261. The Cyanobacteria are also referred to as:
(a) Slime moulds (b) Blue green algae
(c) Protists (d) Golden algae

AIPMT (Screening)-2012

Ans. (b) : The cyanobacteria are unicellular, colonial of filamentus freshwater / marine or terrestrial algae. The Cyanobacteria (also referred to as blue green algae) have chlorophyll a similar to green plants and are photosynthetic autotrophs. The colonies are generally surrounding by gelatinous sheath. They often from blooms in polluted water bodies. Some of these organism can fix atmospheric nitrogen in specialised cells called **heterocysts.**

262. Which one of the following does not differ in E.coli and Chlamydomonas?
(a) Cell wall
(b) Cell membrane
(c) Ribosomes
(d) Chromosomal Organization

AIPMT (Screening)-2012

Ans. (b) : E. coli (bacteria) is a prokaryote while Chlamydomonas (algae) is a eukaryote. It is the cell membrane which has similar organization in both the group.
- Cell wall organization also differs as bacterial cell wall is rich in muramic acid while algae cell wall is rich in cellulosic.

263. Maximum nutritional diversity is found in the group:
(a) Monera (b) Plantae
(c) Fungi (d) Animalia

AIPMT (Screening)-2012

Ans. (a) : Maximum nutritional diversity is found in the group Monera.
- Monera is comprised of two group of Archaebacteria and Eubacteria.
  Monera is a biological kingdom that is made up of prokaryotes, as such, it is composed of single celled organism that lack a nucleous.
- The taxon Monera was first proposed as a phylum by Ernst Haeckel in 1866.
- Classification with the taxon Monera was the five-kingdom system classification system established by Robert Whittaker in 1969.

264. Why is a capsule advantageous to a bacterium?
(a) It allows the bacterium to attach to the surface
(b) It protects the bacterium from desiccation
(c) It provides means of locomotion
(d) It allows bacterium to "hide" from host's immune system

NEET (Karnataka)-2013

Ans. (d) : Capsule advantageous to a bacterium because it allows bacterium to hide from host immune system. S-strain bacteria or virulent bacteria are capsulated made of polysaccharides and amino acids. It is tough and thick mucilage covering providing protection to bacteria against host immune system.

265. The term 'Glycocalyx' is used for
(a) A layer surrounding the cell wall of bacteria
(b) A layer present between cell wall and membrane of bacteria
(c) Cell wall of bacteria
(d) Bacterial cell glyco-engineered to possess N-glycosylated proteins

NEET (Karnataka)-2013

Ans. (a) : Glycocalyx is a carbohydrate protein layer that is covered on many of the eukaryotic and prokaryotic cells.
- It is a sticky gelatinous material that is present outside the cell wall of bacteria, to form an additional surface layer. It is gel-like meshwork that surrounds the cell, constituting a physical barrier for any object to enter the cell. When this layer is firmly attached to the surface of the cell, it is called a capsule.

266. Modern farmer's can increase the yield of paddy upto 50% by the use of :
(a) Cyanobacteria
(b) Rhizobium
(c) Cyanobacteria in Azolla pinnata
(d) Farm yard manure

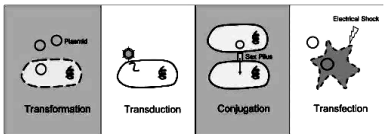
AIPMT-1998

Ans. (c) : The leaves of this species contain the ***Anabaena***, ***Azolla***, which is a symbiont that fixes nitrogen from the atmosphere, that the former can use this to give it is the ability to grow in habitats that are low in nitrogen.
- Farmers keeps their plant in paddy because it generate valuable nitrogen via its symbiotic Cyanobacteria

267. Transduction in bacteria carried out by :
(a) Bacteriophage (b) B.G.A.
(c) Mycoplasma (d) Rickettssiae

AIPMT-1998

Ans. (a) :



Transduction is a mode of genetic transfer from one bacteria to another through a virus.
- There is no direct contact between the bacterial cells.
- In this process, bactoriophages, which infect bacteria, use host cells to multiplicate and while assembling they sometimes pack the bacterial DNA with them.

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268. Which of the following survives a temperature of 104 ºC to 106ºC

(a) Marine Archaebacteria
(b) Hot water spring thermophiles
(c) Seeds of angiosperms
(d) Eubacteria

AIPMT-1998

Ans. (b) : Thermophiles - Thermophiles are microorganisms that grow at high temperature of 55ºC or more.

• Some micro organisms grow in very high temperature (80ºC–113ºC) are called hyperthermophiles.

269. Bacteria are essential in carbon cycle as :

(a) Decomposer (b) Synthesizer
(c) Consumer (d) Primary producer

AIPMT-1998

Ans. (a) : Bacteria are mostly decomposers in the carbon cycles. Bacteria sustain life by their ability to decompose plant and animal bodies, replenishing the limited amount of carbon dioxide needed for photosynthesis. As a result, they act as carbon decomposer in the carbon cycle.

• The decomposers are bacteria, fungi and insects.

270. According to five kingdom system, blue-green algae belongs to

(a) Metaphyta (b) Monera
(c) Protista (d) Algae

J&K CET-2011
AIPMT-1998

Ans. (b) : Blue green algae belongs to kingdom Monera. The Monerans are unicellular, prokaryotes which lack well defined nucleus and other membrane bound organelles.

• Blue green algae, also called **Cyanobacteria**, are heterogeneous prokaryotic organism.
• They are considered the first organism to release oxygen.
• They are believed to be organisms to convert reducing atmosphere to oxidizing atmosphere, as they have chlorophyll, cyanobacteria believed to be developed by endosymbiosis.

271. Non–symbiotic nitrogen fixing bacteria :

(a) Rhizobium (b) Azospirilium
(c) Azotobacter (d) Nitrosomonas

AIPMT-1998

Ans. (c) : Azotobacter is a heterotrophic and aerobic bacteria which converts nitrogen gas into ammonia, form by the process of nitrogen fixation.

• They do not reside inside the root nodules of the plant rather they exist freely in the soil. It is a diazotrophs.
• Rhizobium is a genus of bacteria associated with the formation of root nodules on plant. These bacteria live in symbiosis with legumes, they take in nitrogen form the atmosphere and pass it on to the plants.
• Nitrosomonas is a gram-negative bacteria which oxidized NH_3 into Nitrite.

272. DNA of *E.Coli* :

(a) ds circular (b) ss circular
(c) ds Linear (d) ss Linear

AIPMT-1998

Ans. (a) : E. coli bacteria are comes under prokaryotes. The DNA of E.coli is double-stranded and circular. The nucleic acid is usually double stranded DNA (ds DNA).

• It is an important species in the field of biotechnology and microbiology, where it has served as the host organism for the majority of work with recombinant DNA.

273. Which one produce gas by decomposing the gobar (Dung) in gobar gas

(a) Fungus (b) Virus
(c) Methanogenic bacteria (d) Algae

AIPMT-1999

Ans. (c) : Gobar gas is a term used for the biogas in India. Biogas is produced by the breakdown of the organic matter in the closed container in the absence of the O_2.

Biogas is an alternate source of energy produced by anaerobic breakdown or digestion of biomass such as animal excreta and kitchen waste with the help of methanogenic bacteria.

• Biogas is made up methane (50-70%), CO_2 (30-40%) with traces of nitrogen, hydrogen sulphide and hydrogen.

274. Azolla is used in the cultivation of

(a) Maize (b) Sorghum
(c) Wheat (d) Rice

AIPMT-1999

Ans. (d) : Azolla is a nature's gift for rice cultivation and has tremendous other agricultural use.

• Azolla substaintially increase the amount of nitrogen fertilizer available to growing rice and it has been used for thousands of year as a green nitrogen fertilizer to increase rice production.

275. Anabaena is associated with Azolla

(a) Stem (b) Leaves
(c) Roots (d) Flowers

AIPMT-1999

Ans. (b) : Azolla is a free-floating water fern and has agronomic importance due to its ability to fix nitrogen.

• Azolla is also called the mosquito fern.
• Anabeana forms a symbiotic relationship where its leaves in the ovoid cavities of the dorsal leaves in the term and is connected to the external surrounding through pores.

276. Plant pathogenic bacteria are mostly

(a) Gram + Non spore forming
(b) Gram – Non spore forming
(c) Gram positive spore forming
(d) Gram negative spore forming

AIPMT-1999

Ans. (b) : Several species of bacteria are pathogenic and cause disease but plant pathogenic bacteria are mostly gram -ve non spore forming.

• The gram stain characterises bacteria based on the structural characterstics of their cell walls.

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- While bacteria are known to form endospores, these are rarely plant pathogenic.
- The conidiophores and sporangiospores are reproductive spore formed only in Streptomycetes, some of which are plant pathogens.

277. Koch's Postulates not applicable to

(a) Mycobacterium leprae (b) Tuberculosis
(c) Pneumonia (d) Cholera

AIPMT-1999

Ans. (a) : Koch's postulates not applicable to *Mycobacterium leprae*.

- *Mycobacterium leprae* can not be cultured in vitro, Hence, Koch's postulates are not applicable because its incubation period is 2–5 yr.
- Cholera is caused by *Vibrio cholerae*.
- Diptheria is caused by *Corynebacterium diphtheriae*.

278. In Lederberg's replica plating experiment what shall be used to obtain streptomycin resistant strain : -

(a) Minimal medium and streptomycin
(b) Complete medium and streptomycin
(c) Only minimal medium
(d) Only complete medium

AIPMT-2001

Ans. (b) : If streptomycin resistant mutant are to be obtained, material should be allowed to grow on medium lacking streptomycin so that both mutant and wild types may grow.

- The plate now containing only mutants for streptomycin resistance will grow.
- These colonies are imprinted on petriplates to form the master pattern and other plates having streptomycin can then be pressed on velveteen to get an impression.

279. What is true for cyano bacteria : -

(a) Oxygenic with nitrogenase
(b) Oxygenic without nitrogenase
(c) Non oxygenic with nitrogenase
(d) Non oxygenic without nitrogenase

AIPMT-2001

Ans. (a) : Cyanobacteria, also known as blue green algae (BGA) are photosynthetic prokaryotes. According to Bergey's classification, they are oxygenic photoautotroph. Certain filamentous Cyanobacteria can also act as nitrogen fixers. Nitrogen fixation in cyanobacteria is carried out by nitrogen -fixing cells called **heterocysts,** which have a thick cell wall and presence of oxygen scavenging proteins.

280. Plant Decomposers are : -

(a) Monera and fungi
(b) Fungi and plants
(c) Protista and Animalia
(d) Animalia and Monera

AIPMT-2001

Ans. (a) : Bacteria (Monera) and Fungi can be considered as plant decomposers.

- The bacteria and fungi are heterotrophic organisms which cannot produce their own food and depend on the other organism for the source of food. The fungi and the bacteria feed on the dead and decaying matter and are known as saprophytes and also called decomposers.
- Decomposer refers to an organism that breaks down dead organic material into its constituent elements also referred to as **detritivores**.

281. What is true for Archaebacteria : -

(a) All Halophiles
(b) All photosynthetic
(c) All fossils
(d) Oldest living beings

AIPMT-2001

Ans. (d) : Archaebacteria are the most ancient and halogenous group of bacteria and are called living fossils.

- These were the first organism which evolved on the earth. These organisms have evolved to survive in the extreme conditions like the halophiles, thermophiles, acidophiles.

282. Difference in gram positive and gram negative bacteria is due to –

(a) Cell wall (b) Cell membrane
(c) Ribosome (d) Cytoplasm

AIPMT-2001

Ans. (a) : Gram stain, is a method of staining used to classify bacterial species into two large group: gram-positive bacteria and gram-negative bacteria. The name comes from the Hans Christian Gram, in 1884. Those bacteria which retain the stain are known as Gram positive and those which do not retain the stain are called Gram negative.

- The cell wall in bacteria contains peptidoglycan, a polymer of N-acetyl glucosamine, N- acetyl muramic acid and amino acids.
- Gram –positive cell walls contain a thick layer of peptidoglycan that encircles the cell.
- Gram- negative cell walls contain a thin layer of peptidoglycan between the cytoplasmic membrane and the outer membrane.

283. What is true for plasmid : -

(a) Plasmids are widely used in gene transfer
(b) These are found in virus
(c) Plasmid contain gene for vital activities
(d) These are main part of chromosome

AIPMT-2001

Ans. (a) : Plasmids have the ability to replicate independently which makes it an excellent cloning vector in the recombinant DNA technology for manipulating and transferring genes. They are widely used in genetic engineering for gene transfer.

284. An organism used as a Biofertilizer for raising soyabean crop is :

(a) Nostoc (b) Azotobacter
(c) Azospirillum (d) Rhizobium

AIPMT (Screening)-2011

Ans. (d) : Rhizobium is a bacteria that live inside the root nodules of the leguminous plant. Rhizobium is used as a biofertilizer for raising crop (soyabeans and pea). *Rhizobium japonium* forms a symbiotic association with the plant.

@apna_pdf

285. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage ?

(a) Marsh gas (b) Laughing gas
(c) Propane (d) Mustard gas

AIPMT (Screening)-2011

Ans. (a) : The activity of anaerobic bacteria on sewage produces biogas, commonly called **gobar gas or marsh gas.** Marsh gas produced by physical treatment or primary treatment organic matter (Cow dunk, plant leaves etc) decomposed by activity of anaerobic bacteria in sewage treatment processes produced a rich amount of marsh gas

286. Which one of the following helps in absorption of phosphorus from soil by plants ?

(a) Anabaena (b) Glomus
(c) Rhizobium (d) Fankia

AIPMT (Screening)-2011

Ans. (b) : *Glomus* is a mycorrhizal fungus and participates in symbiotic relationships with plant root and benefit the plant in uptake of phosphorus from soil, production of growth hormones, increase of proteins , lipids, and sugars.

287. The function of leghaemoglobin in the root nodules of legumes is :

(a) expression of ni*f* gene
(b) inhibition of nitrogenase activity
(c) oxygen removal
(d) nodule differentiation

AIPMT (Screening)-2011

Ans. (c) : Leghaemoglobin is an oxygen scavenger. It protects the nitrogen fixing enzyme nitrogenase.

• The nitrogenase enzyme is responsible for converting atmospheric nitrogen into ammonia.

• Leghaemoglobin can't inhibit nitrogenase activity.

288. Nitrifying bacteria :

(a) reduce nitrates to free nitrogen
(b) oxidize ammonia to nitrates
(c) convert free nitrogen to compounds
(d) convert proteins into ammonia

AIPMT (Screening)-2011

Ans. (b) : In the process of bacteria nitrification, ammonia is converted into nitrate with the presence of bacteria in the soil, nitrate are formed by the oxidation of ammonia with the help of Nitrosomonas bacteria species.

• The process of bacteria nitrification involves the following reaction.

$$2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O$$

$$2NO_2^- + O_2 \rightarrow 2NO_3^-$$

289. In eubacteria, a cellular component that resembles eukaryotic cell is :

(a) Cell wall (b) Plasma membrane
(c) Nucleus (d) Ribosomes

AIPMT (Screening)-2011

Ans. (b) : In eubacteria, a cellular component that resembles eukaryotic cell is plasma membrane. It is made up of phospholipid, protein and some amount of polysaccharides.

290. Organisms called Methanogens are most abundant in a

(a) Hot spring (b) Sulphur rock
(c) Cattle yard (d) Polluted stream

AIPMT (Screening)-2011

Ans. (c) : Methanogens are mostly found in cattle yard and marshy area. Methanogen belongs to Archaebacteria group. They are capable of producing methane gas or bio gas.

• Methanogens are coccoid (spherical shaped) or bacilli (rod shaped). They are mostly anaerobic organism. The reduction reaction of CO_2 into CH_4 in the presence of hydrogen.

$$CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$$

291. Assertion : Plasmids are single-stranded extra chromosomal DNA.

Reason : Plasmids are possessed by eukaryotic cells.

(a) Both assertion and Reason are true and reason is the correct explanation of Assertion
(b) Both Assertion and reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Both Assertion and Reason are false.

AP EAMCET-2011
AIIMS-1997

Ans. (d) : Plasmids are small circular, double - stranded, self-replicating, additional or extra chromosomal DNA which are commonly found in bacteria (prokaryote).

292. PPLO are smallest cell in the living world. The extend form of PPLO is

(a) Pseudo Pneumonia Length Orge
(b) Pseudo Plank Leg Organelle
(c) Pneumonia Plank like Organism
(d) Pleuro Pneumonia Like Organism

JIPMER-2016
AMU-1999

Ans. (d) : Pleuro Pneumonia Like Organisms is the full form of PPLO in biology. Mycoplasma is another name for the PPLO which is the tiniest cell or creatures, measuring between 0.1 and 0.3 mm in diameter.

293. In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statements is true about archaea?

(a) Archaea completely differ from both prokaryotes and eukaryotes
(b) Archaea completely differ from prokaryotes
(c) Archaea resemble eukarya in all respects
(d) Archaea have some novel features that are absent in other prokaryotes and eukaryotes

AIPMT-2008

Ans. (d) : Archea belong to the domain Archaea and are single celled, prokaryotic organisms that do not have membrane bound organelles and are distinct from both bacteria and eukaryotes. One unique character of Archaea is their ability to thrive in extreme environmental conditions that would kill other life forms.

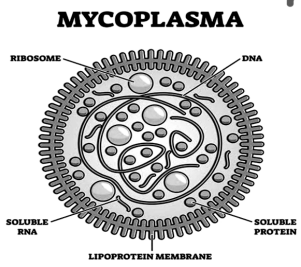
@apna_pdf

• The group contains methanogens that can produce methane gas. The DNA of these organisms is generally present in a relaxed state or as positively coiled. The cell wall of these organisms does not contain lipids, peptidoglycan etc.

294. Which one of the following statements about mycoplasma is wrong?
(a) They cause diseases in plants
(b) They are also called PPLO
(c) They are pleomorphic
(d) They are sensitive to penicillin

AIPMT-2007
CG PMT-2005

Ans. (d) : Mycoplsma is the free living and the simplest of the prokaryotes. They were found in the pleural fluid of the animals who were suffering from pleuropneumonia and they are called PPLO which stands for pleuropneumonia like organism.



295. The wall of bacteria consists of
(a) N- acetyl glucosamine
(b) N- acetyl muramic acid
(c) both (a) and(b)
(d) cellulose

UP CPMT-2005
DUMET-2005

Ans. (c): The bacterial cell wall consists of peptidoglycan, is a polymer of N- acetyl glucosamine and muramic acid. Cellulose is a polymer of glucose.

296. How many genes are present in E. coli?
(a) 200 (b) 230
(c) 231 (d) None of these

UP CPMT-2005

Ans. (d): The E. coli chromosome is currently represented by 4,401 genes encoding 116 RNAs and 4285 protein modules.

297. A bacterial cell wall is mainly composed of
(a) Mucopolysaccharides
(b) Sialomuco protein
(c) Peptidoglycan (murein)
(d) Glycogen and muramic acid

UP CPMT-2014
VMMC-2003 / AIIMS-1999

Ans. (c): A bacterial cell is composed of mainly peptidoglycan (murein). It also contain lipid, protein and polysaccharide. The peptidoglycan contain, N-acetylglucosamine (NAG) and N-acetyl muramic acid (NAM).

• In addition to these constituent L - alanine and D-alamine, D-glutamic acid and diaminopimelic acids are also found.

298. Which cell is most minute and smallest free-living organism?
(a) Mollicutes (b) Bacterium cell
(c) Prions (d) Viroids

UP CPMT-2014

Ans. (a): Mycoplasma or mollicutes is smallest and minute free-living organisms. They were discovered by Nocard and Roux (1898).
They are cell wall devoid, pleomorphic. Gram negative Monera member with smallest cell size (0.1–0.15μm). These are popularly known as Pleuro pneumonia Like Organism (PPLO).

299. Circular free floating molecule of DNA duplex, autonomous, found in bacterial cytoplasm are extensively used as vector in genetic engineering
(a) Cosmids (b) Phages
(c) Plasmids (d) Bacterial DNA

UP CPMT-2014
BVP-2006

Ans. (c): Plasmids are circular, free floating molecule of DNA duplex (extra-chromosomal DNA) autonomous, found in bacterial cytoplasm as (extra-chromosomal DNA).
These are extensively used as vector in field of genetic engineering to insert the desirable gene into organism.

300. Bacteria differ from plants in that they do not have
(a) DNA (b) RNA
(c) cell wall (d) a well define nucleus

UP CPMT-2011

Ans. (d): Bacteria are prokaryote unicellular organisms. They lack membrane bounded cell organelles and a well-defined nucleus. Plants are eukaryotes multicellular organisms. They are eukaryote. They have organelles and well defined nucleus.
Both plant and bacteria have cell wall and DNA and RNA but the cell wall of plant cell made up of cellulose and bacteria cell wall is made up of murein.
• In plant cell wall, DNA found in multiple chromosomes while in bacterial cell wall DNA is in a single circular ring.

301. Identify a micro-organism that can produces biomass of protein.
(a) Monoscus purpureus
(b) Aspergillus niger
(c) Methylophilus methylotrophus
(d) Trichoderma polysporum

Karnataka CET-2016

Ans. (c) : The methylotrophic bacterium *Methylophilus methylotrophus* hydrolyses urea to ammonia using a cytoplasmic urease. During growth in continuous culture under various nutrient limitations urease was induced by urea and short- chain amides and repressed by excess ammonia.

302. Match the types of bacteria listed in column I with their activity given in column II. Choose the correct combination of alphabets of the two columns.

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Column-I (Types of bacteria)		Column-II (Activity)	
A	Streptomyces	p	Food poisoning
B	Rhizobium	q	Source of Antibiotics
C	Nitrosomonas	r	Nitrogen fixation
D	Acetobacter	s	Nitrification
		t	Vinegar synthesis

(a) A = s; B = t; C = p; D = r
(b) A = t; B = p; C = r; D = s
(c) A = q; B = r; C = p; D = t
(d) A = q; B = r; C = s; D = t

Karnataka CET-2004

Ans. (d) :

Column-I (Types of bacteria)		Column-II (Activity)
A. Streptomyces	–	q. Source of Antibiotics
B. Rhizobium	–	r. Nitrogen fixation
C. Nitrosomonas	–	s. Nitrification
D. Acetobacter	–	t. Vinegar synthesis

303. Identify the plasmid……

(a) Eco RI (b) pBR 322
(c) AIU I (d) Hind III

Karnataka CET-2004

Ans. (b) : pBR 322, in order to link the alien DNA the vector needs to have very few recognition site of the commonly used restriction enzymes.

304. Which of the following statements is right?

(a) Diatoms produce basidiospores.
(b) Heterocysts are found in Nostoc.
(c) Fronds are found in Bryophytes.
(d) Multiciliate sperm are found in Angiosperm

Karnataka CET-2004

Ans. (b) : Nostoc species are filamentous cyanobacteria. These organisms have the ability to fix atmospheric N_2 with the help of enzyme present in heterocyst. Basidiospores are produced by basidiomycetes. Fronds are found in pteridophytes. Cilia are absent in sperm of angiosperms.

305. Match the following lists

List I	List II
(A) Syphilis	(i) Acetobacter
(B) Pathogen of cattle	(ii) Agrobacterium
(C) Crown Gall of Apples	(iii) Corynebacterium
(D) Diphtheria	(iv) Mycobacterium
	(v) Treponema

The correct match is

	A	B	C	D
(a)	(iii)	(i)	(iv)	(ii)
(b)	(v)	(iv)	(ii)	(iii)
(c)	(v)	(iii)	(ii)	(i)
(d)	(ii)	(iv)	(v)	(iii)

AP EAMCET-2013

Ans. (b):

List-I		List-II
Syphilis	–	Treponema
Pathogen of cattle	–	Mycobacterium
Crown gall of apples	–	Agrobacterium
Diptheria	–	Corynebacterium

306. Study the following list

List I	List II
(A) *Pasteurella pestis*	1. Angular leaf spot of cotton
(B) *Treponema pallidium*	2. Amphotericin
(C) *Mycobacterium bovis*	3.Actinomycosis of cattle
(D) *Streptomyces nodosus*	4. Syphilis
	5. Plague

The correct match is

	A	B	C	D
(a)	4	1	2	3
(b)	2	3	4	5
(c)	5	4	3	2
(d)	3	2	1	4

AP EAMCET-2009

Ans. (c) :

(A)	*Pasteurella pestis*	-	Plague
(B)	*Treponema pallidium*	-	Syphilis
(C)	*Mycobacterium bovis*	-	Actinomycosis of cattle
(D)	*Streptomyces nodosus*	-	Amphotericin

307. Match the column I with column II and select the correct option.

Column I	Column II
(A) Bacillus thuringiensis	(1) Production of chitinases
(B) *Rhizobium meliloti*	(2) Scavenging of oil spills
(C) *Escherichia coli*	(3) Incorporation of 'nif' genes
(D)*Pseudomonas putida*	(4) Production of Bt-toxin
(E) Trichoderma	(5) Production of human insulin

	A	B	C	D	E
(a)	2	4	4	5	3
(b)	2	4	5	1	3
(c)	4	3	5	2	1
(d)	5	4	3	1	2

AP EAMCET-2011

Ans. (c) : *Bacillus thuringiensis* is a gram-positive bacteria that produces crystal proteins toxin specific to the target insect, but it is not toxic to humans and non-target organism.

- ***Rhizobium meliloti*** – It contains Nif genes, that encodes enzymes involved in the fixation of atmospheric nitrogen into ammonium compound.
- ***Escherichia coli*** – Gene for production of human insulin can be transferred to *Escherichia coli* by recombinant DNA technique.

@apna_pdf

- ***Pseudomonas putida*** – Genetically engineered bacteria which is used for scavenging of oil spills by digesting hydrocarbons of crude oil.
- **Trichoderma** – Chitinase production by *Trichoderma harzianum* grown on a chitin-rich mushroom by product formulated medium.

308. Which one of the following pairs is not correctly matched :-
(a) **Serratia**–Drug addiction
(b) **Spirulina** – Single cell protein
(c) **Rhizobium** – Biofertilizer
(d) **Streptomyces** – Antibiotic

AIPMT-2004

Ans. (a) :
- Serratia is a genus of gram negative, facultatively anaerobic, rod-shaped bacteria of the family **Yersiniaceae.**

309. Which one of the following bacteria has found extensive use in genetic engineering work in plants?
(a) Bacillus coagulens
(b) Agrobacterium tumefaciens
(c) Clostridium septicum
(d) Xanthomonas citri

MGIMS Wardha-2010

Ans. (b) : *Agrobacterium tumifaciens* is a soil bacterium that is transferred to the plants through the wounded region and causes gall tumors in plants. This bacterium contains a plasmid Ti plasmid or tumor inducing plasmid.
- It is popular in genetic engineering because this bacterium is associated with the roots of the all cereal and pulse crops.

310. In which kingdom, would you classify the archaea and nitrogen-fixing organisms. If the five-kingdom system of classification is used?
(a) Protista (b) Monera
(c) Plantae (d) Fungi

MGIMS Wardha-2010
CGPMT-2007

Ans. (b) : Archaea and nitrogen fixing bacteria or organisms are prokaryotic in nature. Hence, they can be placed in the kingdom monera.
- Monera includes eubacteria and archaea. They include non-nucleated unicellular organisms. They are prokaryotics. They have a cell wall. They have no membrane bound organelles and true nucleus.

311. Chromosomes in bacterial cell can be 1 to 3 in
(a) number and can be either circular or Linear, but never both within the same cell
(b) can be circular as well as linear within the same cell
(c) are always circular
(d) are always linear

MGIMS Wardha-2010
Uttarakhand PMT-2007

Ans. (c) : Bacterial chromosome is called nucleiod. It is an irregularly shaped and contains genetic material.
Bacterial cell usually have one circular chromosome of a few metabase in size.
- They often have plasmids whose size range from a few to one hundred or kilobases.
- Bacteria possess a single circular chromosome comprised of double stranded DNA molecule.

312. Bacterial endotoxin is
(a) a toxic protein that stays inside the bacterial cell
(b) a toxic protein that is excreted into the medium
(c) lipopolysaccharide located on the surface of the bacteria
(d) None of the above

JIPMER-2013

Ans. (c) : Bacteria secretes toxins which is divided into two category :- (i) Endotoxin (ii) Exotoxin.
- Endotoxins are membrane compounds of gram-negative bacteria which elicit an inflammatory response in host.
- Exotoxins are secretes proteins which act locally and at distance of bacterial colonization site.

313. Colourless, unicellular, cell wall bound, spherical or rod-shaped micro-organism and lacking organised nucleus is called
(a) mycoplasma (b) virus
(c) bacteria (d) cyanobacteria

UP CPMT-2004

Ans. (c) : Colourless, unicellular, cell wall bound, spherical or rod-shaped micro-organism and lacking organised nucleus is characteristic feature of bacteria. Bacteria are found almost everywhere on earth and it play vital role to the maintain ecosystem.

314. Tuberculosis is caused by
(a) Mycobacterium sp. (b) Aspergillus sp.
(c) Clostridium sp. (d) Vibrio sp.

WB JEE-2010

Ans. (a) : Tuberculosis is a bacterial disease caused by bacteria Mycobacterium tuberculosis.
- Bacteria usually attack the lungs but T.B. bacteria can attack any part of the body such as kidney, brain etc.
- It is spread from one person to the other through the air, people who have active Tuberculosis in their lungs.

315. Bacteriophages kill
(a) fungi (b) parasites
(c) bacteria (d) viruses

WB JEE-2010

Ans. (c) : Bacteriophages are viruses that kill bacteria. Bacteriophages are composed of protiens that encapsulate a DNA or RNA genome and may have structure that are either simple or elaborate.
- Bacteriophages are so small they do not even have a single cell, but are instead just a piece of DNA surrounded by a protein coat. When they attack a bacterium, bacteriophages can multiply very quickly until the bacterium bursts and releases lots of new phages.

@apna_pdf

316. Bacteria with single flagella at one end is called:
(a) monotrichous (b) lophotrichous
(c) amphitrichous (d) peritrichous
Rajasthan PMT-2004

Ans. (a) : Bacteria with single flagella at one end is called monotrichous.
• Bacterial flagella are a coiled thread like structure sharp bent consisting of a rotary motor of its base and are composed of the flagellin protein.

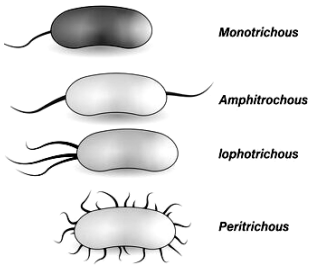


Fig:- Types of bacteria

317. Bacteria causing disease of citrus is:
(a) citrus leaf spot
(b) stunt disease
(c) citrus canker
(d) citrus greening leaf disease
Rajasthan PMT-2004

Ans. (c) : Citrus canker is a bacterial disease caused by the bacterium *Xanthomonas citri.*
- It affects the leaves, twigs and fruit of citrus plants, causing the leaves to drop and unripe fruit fall to the ground.
- Citrus canker is most severe in hot, wet areas.

318. O_2 does not evolved in photosynthesis of:
(a) BGA (b) green algae
(c) bacteria (d) autotrophic plant
Rajasthan PMT-2004

Ans. (c) : Plants produce organic food by the help of photosynthesis. Like plants, some bacteria are capable of synthesising their organic food in presence of light, which is known as **bacterial photosynthesis.** This process is anoxygenic thats why they do not produce O_2.

319. When the procedure of bacterial staining is carried out, the Gram negative bacteria stains :
(a) red (b) green
(c) purple (d) black
AFMC-2000

Ans. (a) : When the procedure of bacterial staining is carried out, the Gram negative bacteria stains red. Stains and dyes are used to highlight the microscopic level to study it at higher magnification for histopathological studies and diagnostic purposes. However, staining is not just limited to biological specimens. It can also be used to study the structure of crystalline polymers.
• Gram's staining procedure is used to identify becteria based on their cell wall composition.

320. The cell wall material present only in bacteria and blue-green algae is
(a) pectin (b) cellulose
(c) chitin (d) muramic acids
AMU-2015

Ans. (d) : Muramic acid is an amino sugar acid. It occurs naturally as N-acetyl muramic acid in peptidoglycan, whose primary function is a structural component of many typical cell walls.
• Muramic acid, is a component of the muramyl peptide found only in the cell wall of bacteria and blue green algae.

321. Which is the hereditary material in bacteria?
(a) Nucleic acid
(b) Nucleic acid cytoplasm
(c) Nucleic acid and histone
(d) None of the above
BCECE-2005

Ans. (a) : The DNA of most bacteria is contained in a single circular molecule called the **bacterial choromosome.** The chromosome along with several protiens and RNA molecules, forms an irregularly shaped structure called the **nucleiod.** This sites in the cytoplasm of the bacterial cell.
The genetic material is free irregular, thin fibril double - stranded circular DNA.

322. Mesosomes are found in:
(a) Yeast (b) Acetabularia
(c) Bacteria (d) Chara
BHU PMT-2002

Ans. (c) : Mesosomes are organelles formed by plasma membrane infoldings and found in the membrane of bacteria.
- Mesosome play a role in the formation of cell walls.
- They are involved in the replication of DNA in prokaryotic.
- Increase plasma membrane surface area and enzymatic content.
- Mesosomes are analogous to cristae in the mitochondria in eukaryotic cells.

323. Type of genetic material present in bacteria is:
(a) DNA
(b) DNA with histones
(c) RNA with histones
(d) RNA without histones
Punjab MET-2003
BHU PMT-2002

Ans. (a) : The genetic material of bacteria and plasmids is DNA. Bacterial viruses (bacteriophages) have DNA or RNA as genetic material.
- The bacterial chromosome is one long-single molecule of double - stranded helical supercoiled DNA.
- Bacterial DNA contains Uracil instead of Thymine.
- Prokaryotic cells typically have only a single circular chromosome.

324. In bacteria respiration occurs in:
(a) cytoplasmic membrane
(b) mitochondria
(c) nuclear membrane
(d) endoplasmic reticulum
BHU PMT-2003

Ans. (a) : The cytoplasm or protoplasm of bacterial cells is where the functions for cell growth, metabolism, respiration and replication are carried out because bacteria is a prokaryotic cell.
• Some bacteria exhibit a unique mode of respiration called anaerobic respiration.

@apna_pdf

325. In bacterial cell enzymes for aerobic respiration are found in:
(a) Ribosome (b) Mesosome
(c) Mitochondria (d) None of these
Punjab MET-2003
Rajasthan PMT-1996

Ans. (b) : Generally mesosomes are found in association with nuclear area or near the site of cell division they are absent in eukaryotes.
- Mesosomes are the invaginated structures formed by the localized in folding of the plasma membrane. The invaginated structures comprise of vesicles, tubules of Lamellar Whorls.
- Mesosomes are supposed to take part in respiration but they are not analogous to mitochondria.

326. Blue-green algae are
(a) prokaryotic (b) eukaryotic
(c) monocots (d) dicots
UP CPMT-2010

Ans. (a) : Blue green algae are prokaryotes.
- Blue green algae and some bacteria are photosynthetic autotrophic. Their photosynthetic thylakoids lie freely in the cytoplasm.
- Prokaryotic cells lack in mitochondria, endoplasmic reticulum etc.

327. Which of the following have flagella on both ends of the bacterial cell?
(a) Monotrichous (b) Amphitrichous
(c) Lophotrichous (d) Peritrichous
UP CPMT-2010, 2001

Ans. (b) : The bacteria cells having one or more flagella at the opposite side of their cell body are **amphitrichous**.
• Amphitrichous bacteria contain a single flagellum on each of their two opposite end since only one flagellum is active at once. The bacterium can quickly change its direction by switching the flagellum in use.

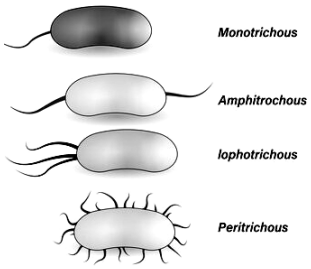


Fig :- Types of bacteria

328. Pigment present in cyanobacteria is
(a) r - phycocyanin (b) r-phycoerythrin
(c) c-phycocyanin (d) anthocyanin
BHU PMT (Screening)-2007
UP CPMT-2003

Ans. (c) : Pigment present in Cyanobacteria is c-phycocyanin. A Cyanobacteria is an ancient group of photosyntetic prokaryotes that are thought to be the first organism to carry out oxygenic photosynthesis.
• C-phycocyanin is used to capture light energy for photosynthesis.
• Cyanobacteria contain pigments like **phycoerythrin** and **phycocyanin** which are responsible for their blue-green color and only due to appearance these bacteria are called **blue-green algae** although they are not algae at all.
• Cyanobacteria are the prokaryotic organisms found in lake. Oceans capable of using sun light as their energy.

329. The wall of bacteria is consists of
(a) N-acetyl glucosamine
(b) N-acetyl muramic acid
(c) both (a) and (b)
(d) cellulose
UP CPMT-2003

Ans. (c) : Bacteria cell wall is made up of peptidoglycan, has N-acetyl glucosamine and N-acetyl muramic acid with small peptide chain, which is a component of the bacterial cell wall.

330. Bacteria do not have
(a) ribosome
(b) protein synthesizing apparatus
(c) mitochondria
(d) cell wall
Uttarakhand PMT-2007
UP CPMT-2003

Ans. (c) : Bacteria do not have mitochondria, because mitochondria is a membrane bound organelles and present in eukaryotic cell. In Bacteria, prokaryotic cell are present. In prokaryotic cell, no any membrane bound organelles are found.

331. In which of the following oxygen does not evolve during photosynthesis?
(a) Photosynthetic red algae
(b) Photosynthetic green algae
(c) Photosynthetic blue-green algae
(d) Photosynthetic bacteria
UP CPMT-2003

Ans. (d) : Photosynthetic bacteria does not evolve oxygen during photosynthesis. Photosynthetic bacteria directly utilize energy from solar radiation and electron from inorganic or organic compound. The photolysis of H_2O does not takes place in photosynthetic bacteria so oxygen is not involved.

332. Cyanobacteria is an
(a) algae having blue-green pigment
(b) algae having red pigment
(c) algae having brown pigment
(d) algae having yellow-brown pigment
UP CPMT-2003

Ans. (a) : Cyanobacteria is an algae having blue-green pigment. Cyanobacteria is also called blue green algae.
Cyanobacteria is a microscopic organism found naturally in all types of water.
These organism use sunlight to make their own food.

333. The peptidoglycans of bacteria consist of
(a) sugars, D-amino acids and L-amino acids
(b) sugars and only D-amino acids
(c) sugars and only L-amino acids
(d) sugars and glycine
KVPY SB and SX-2015

@apna_pdf

Ans. (a) : Bacteria cell wall contains sugar (NAG), D-amino acid and L-amino acid.

- Peptidoglycan is a polymer that is made up of sugars and amino acids. Diaminopimelic acid and muramic acid are present in the wall of bacteria and cyanobacteria.
- The sugar component is made up of alternating N- a cetyl glucosamine acid (NAG) and N - acetyl muramic acid (NAM).
- Muramic acid is then attached to the amino-acid chain of L-alanine, D-glutamic acid.

334. Which is a wrong statement?

(a) Plasmids of cyanobacteria have been used in biotechnology
(b) DNA of cyanobacteria is circular and double-stranded
(c) Cyanobacteria possess single linkage group
(d) Like bacteria, they also exhibit genetic recombination

Manipal-2011

Ans. (a) : Plasmids are usually circular molecules of DNA, although occasionally plasmid that are linear or made of RNA exist.

- Plasmid can duplicate independent of the genome.
- Plasmids are useful in cloning short segment of DNA.
- Plasmid can be used to replicate proteins.

335. Which of the following organisms completely lack cell wall, they are the smallest living cells known and can survive without oxygen?

(a) Mycoplasma (b) Euglenoids
(c) Slime moulds (d) All of these

AFMC -2009
MGIMS Wardha-2009

Ans. (a) : Mycoplasma are the smallest and simplest self-replicating bacteria.

- Mycoplasma cell contains the minimum set of organelles essential for growth and replication a plasma-membrane ribosomes and a genome consisting of a double stranded circular DNA molecule.
- Mycoplasma can survive without oxygen.

336. Which of the following statement is correct?

(a) All bacteria are heterotrophic
(b) Bacteria are either heterotrophic or chemoautotrophic
(c) Bacteria can also be photoautotrophic
(d) Bacteria are either photoautotrophic or chemoautotrophic

DUMET-2010

Ans. (c) : A photosynthetic organism that utilizes energy from light to synthesize organic molecule such as a green plant or a Cyanobacterium.

- Photoautotrophs are organisms that carry out photosynthesis, using energy from sunlight, carbon dioxide and water are converted into organic materials to be used in cellular functions such as biosynthesis and respiration.

337. Which one of the following does not belong to kingdom-Monera?

(a) Mycoplasma (b) Archaebacteria
(c) Slime mould (d) Eubacteria

DUMET-2008

Ans. (c) : Slime mould organisms that exist as slimy masses and are commonly found on decaying plant matter.

- Slime mould are saprophytic and lack chlorophyll.
- They are classified among the Protista as two distinct phyla. Dictyosteliomycota (the cellular slime mould) and Myxomycota (the plasmodial slime mould).

338. Which of the following is symbiotic bacteria?

(a) Rhizobium (b) Azotobactor
(c) Clostridium (d) Streptomyces

JCECE-2005

Ans. (a) : Rhizobium is a genus of Gram - negative soil bacteria that fix - nitrogen.

- It forms an endosymbiotic nitrogen fixing associated with roots of legumes.
- They take nitrogen from the atmosphere and pass it, on to plant allowing it to grow in soil low in nitrogen.

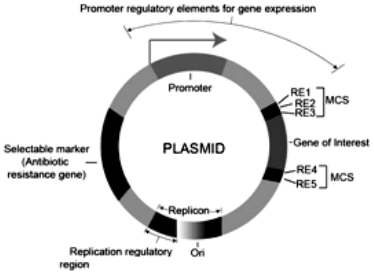
339. The autonomously independent self replicating extra nuclear DNA imparting certain factors to some bacterium is called

(a) plastid (b) plasmid
(c) phagemid (d) cosmid

J&K CET-2009

Ans. (b) : Plasmid is a small, circular double stranded DNA molecule that is distinct from a cells chormosomal DNA.

- Plasmid naturally exist in bacteria.
- Genes carried in plasmids provide bacteria with genetic advantages, such as antibiotic resistance.
- Plasmids are physically separate from chromosomal DNA and replicate independently.



340. The term bacteria was coined by

(a) Leeuwenhoek (b) Louis Pasteur
(c) Robert Koch (d) Ehrenberg

J&K CET-2009

Ans. (d) : The Genus bacterium was a taxon described in 1828 by Christian Gottfried Ehrenberg.

- The type of species was later changed from bacterium triloculare to bacterium coli, now Escherichia coli as it was lost.
- In 1676 Antonie Van Leeuwenhoek first observed bacteria through a microscope called then animalcules.

341. The genetic material of bacteria is present as:

(a) spherosome (b) genophore
(c) lomasomes (d) mesosome

JIPMER-2002, 1997

Ans. (b) : The genetic material of bacteria is present as genophore. It refers to chromosome equivalent in prokaryotes, virus and semi- autonomous organelles that serves as heredity material it consist of nucleic acid. DNA or RNA but lack histone protein.

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• Many eukaryotes (such as plants and animals) carry genophores in organelles such as mitochondria and chloroplast. These organelles are very similar to true prokaryotes.

342. The site of photosynthesis in blue-green algae is
(a) Chromatophores (b) Mitochondria
(c) Chloroplast (d) Root hair

BCECE-2014
Uttarakhand PMT-2009
BHU PMT (Screening)-2009

Ans. (a) : Cynobacteria or blue-green algae are prokaryotes and hence lack membrane bound organelles such as chloroplast. They possess chromatophores insted of chloroplast as the site of photosynthesis.
• Chromatophore are pigment - containing vesicles that are found in cell cytoplasm and play vital role in photosynthesis.

343. Of the following statements which are not relevant to Archaebacteria?
(A) They live in some of the most harsh habitats
(B) They are present in the gut of several ruminant animals
(C) They are characterized by the presence of a rigid cellulosic cell wall
(D) They include mycoplasma
(E) They are also referred to as blue-green algae
(a) A, B and C (b) A, C and E
(c) C, D and E (d) A, C and D
(e) B, C and E

Kerala PMT-2015

Ans. (c) : Archaebacteria live in some of the harsh habitats. They have cell wall which is made up of polysaccharides and protein, without peptidoglycan. They are also present in the gut of several ruminant animal.

344. Which of the following characters belongs to the Kingdom Monera?
(a) Eukaryotic
(b) Heterotrophic
(c) Multicellular
(d) Presence of cell walls made of cellulose
(e) Presence of nuclear membrane

Kerala PMT-2015

Ans. (b) : Heterotrophic organisms are those organism which can not prepare their own food through the process of photosynthesis and they depend on autotrophs for nutrition directly or indirectly.
• All animals and non-photosynthetic plants are classified as heterotrophs since they are unable to prepare food.

345. Maximum number of bases in plasmid discovered so far is
(a) 50 kilobase (b) 500 kilobase
(c) 5,000 kilobase (d) 5 kilobase

BHU PMT (Screening)-2010

Ans. (b) : Plasmids have a wide range of length from roughly one thousands DNA base pairs to hundreds of thousands of bases pairs.
• Plasmids are known to vary from 5 to 500 kilo base in size although plasmid as small as 2 kilo base to as large as more than 1 mb in size has been reported.

346. What is true for archaebacteria?
(a) All are halophilic
(b) All are photosynthetic
(c) All are fossils
(d) These are oldest living beings

BHU PMT (Screening)-2010

Ans. (d) : The oldest living organisms on earth are known as Archaebacteria. They belong to the kingdom Monera and are classified as bacteria because they resemble bacteria when observed under a microscope.
• Archaebacteria have the capability to produce methane.

347. The red color of red sea is due to which of the following blue-green algae?
(a) Chlamydomonas nivalis
(b) Anabaena
(c) Microcystis
(d) Trichodesmium

JIPMER-2003

Ans. (d) : Trichodesmium is a diazotroph that is fixes atmospheric nitrogen into ammonia a nutrient used by other organisms.
• Trichodesmium is thought to fix nitrogen on such a scale that it accounts for almost half of the nitrogen fixation in marine systems globally.
• Trichodesmium are Cyanobacteria also known as blue-green algae.
• It is widely accepted that the red sea is caused by Trichodesmium.

348. Blue-green algae is found in :
(a) Cycas (b) Pinus
(c) Scales of Marchantia (d) Riccia

JIPMER-2003

Ans. (a) : Nostoc and Anabaena are blue green algae. These are commonly found in the coralloid root of Cycas but other Nostocales can also be found. They have the necessory characteristics to infect the roots and to develop and maintain a symbiotic relationship with the Cycas.
• Coralloid root systems form near the surface of the soil where they are not hidden from light.

349. In prokaryotes, chromatophores are
(a) specialized granules responsible for coloration of cells
(b) structures responsible for organizing the shape of the organism
(c) incusion bodies lying free inside the cells for carrying out various metabolic activities
(d) internal membrane systems that may become extensive and complex in photosynthetic bacteria

Rajasthan PMT-2010

Ans. (d) : Chromatophores are pigment-containing vesicles that are found in the cell cytoplasm.They are present in prokaryotes such as Cyanobacteria and Rhodospirillum.
• Chromatophore is found in some photosynthetic bacteria. These are the pigment - containing phycobilin that are necessary for photosynthesis take place

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350. Nuclear membrane is absent in

(a) Monera (b) Protista
(c) Fungi (d) Plantae

AMU-2010

Ans. (a) : The nuclear membrane is a double layer that encloses the cells nucleus, where chromosome reside.

Nuclear membrane are absent in kingdom Monera, because here all organism are unicellular prokaryotes.

- Nuclear membrane separate the chromosome from the cells cytoplasm and other contents.
- It provide the structural framework of the nucleus.
- The nuclear membrane acting as barrier that prevent the free passage of molecules between the nucleus and the cytoplasm.

351. One of the following is not the characteristic feature of Cyanobacteria

(a) They are multi cellular
(b) They form colonies
(c) They form blooms in polluted water bodies
(d) They can fix atmospheric nitrogen

AMU-2010

Ans. (a) : Cyanobacteria also known as **Cyanophyta** are a group of Gram negative bacteria that obtain energy via photosynthesis. They are unicellular organism.

- Cyanobacteria are a special category of bacteria that can perform photosynthesis.
- They have chlorophyll and carry out oxygen producing photosynthesis as much as plant and eukaryotic algae.

352. Select the most successful group of organism on the surface of our globe

(a) Gram positive heterotrophs
(b) Gram negative photosynthetic cyanobacteria
(c) Chemoautotrophic bacteria
(d) Photoautotrophic bacteria

AMU -2000

Ans. (b) : Cyanobacteria are a group of bacteria that are able to do photosynthesis.

- A family of photosynthetic bacteria known as Cyanobacteria are widely dispersed in both aquatic and terrestrial. Hence, the most successful group of organism on the surface of our globe is Gram negative photosynthetic Cyanobacteria.

353. The characteristic cells wall material peptidoglycan has another covering of lipopolysaccharides. This specialized condition is found in

(a) Eubacteria Gram positive
(b) Eubacteria Gram negative
(c) All eukaryotes
(d) Both (a) and (b)

AMU -2000

Ans. (b) : Eubacteria is a genus of Gram-positive bacteria in the family Eubacteriaceae.

These bacteria are characterised by rigid cell wall.

- They may be either be motile or non-motile.
- Gram- negative bacteria are surrounded by a thin peptidoglycan cell wall which itself is surrounded by an outer membrane containing lipopolysaccharide.

354. Gram negative heterotrophic bacteria that can biodegrade a variety of natural as well as man-made organic compounds, such as petroleum products, include

(a) cyanobacteria (b) clostridia
(c) archaebateria (d) none of these

AMU-1999

Ans. (d) : Bacteria with the ability to degrade hydrocarbon are named as hydrocarbon degrading bacteria.

- Biodegradation of hydrocarbons can occur under aerobic and anaerobic conditions.
- Waste materials can be broken down into simple, non-toxic substances by microorganism.

355. The rumen of cattle is the site of fermentation of cellulose fibres through the action of

(a) archaebacteria (b) cyanobacteria
(c) mycoplasmas (d) spirochaetes

AMU-1999

Ans. (a) : Archaebacteria is a group of kingdom monera which is found in extreme habitats such as hot springs, marshy areas.

- Archaea is a domain of single celled organisms these microorganisms lack cell nuclei.
- Archaebacteria have the capability to produce methane i.e. are methanogens.

356. The nature of photosynthesis in blue-green algae is

(a) Oxygenic (b) Anoxygenic
(c) Anaerobic (d) None of these.

AMU-1998

Ans. (a) : The oxygenic photosynthesis performing organisms are called Cyanobacteria. The blue-green algae were the first oxygenic photoautotrophs on the planet earth. It is found in eukaryotes.

357. Heterocysts are found in:

(a) Aspergillus (b) Nostoc
(c) Cystopus (d) Ulothrix

HP CET-2013
VMMC-2002

Ans. (b) : A heterocyst is a differentiated cyanobacterial cell that carries out nitrogen fixation.

- It is the site for nitrogen fixation under aerobic conditions.
- Heterocysts are found in many species of filamentous blue-green algae. They are cells of slightly larger size and with a more thickned wall than the vegetative cells.
- Example-Nostoc, Anabaena etc.

358. Which of the following is free living aerobic, non- photosynthetic nitrogen fixing bacterium?

(a) Rhizobium (b) Azotobacter
(c) Nostoc (d) Azospirillium

HP CET-2013

Ans. (b) : Azotobacter are free living aerobic and non photosynthetic nitrogen fixing bacteria. It retains the capability of fixing atmospheric nitrogen i.e. fixation of atmospheric nitrogen into ammonia.

@apna_pdf

359. A pigment in cartenoid is found in bacteria and fungi, it is:

(a) fuxocanthin (b) lycopene
(c) capsanthin (d) xanthophyll

VMMC-2006

Ans. (c) : Capsanthin is a natural red dye of the xanthophylls class of carotenoids. It is also found in some species of lily. It is a carotenoid compound with antioxidant properties that help protect cells from oxidative damage.

360. The site of respiration in bacteria is:

(a) microsome (b) mesosomes
(c) episome (d) ribosome

VMMC-2006

Ans. (b) : Mesosomes is a convoluted membranous structure formed in prokaryotic cell by the invagination of the plasma-membrane.

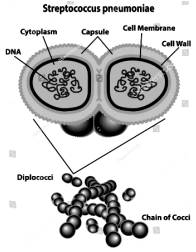
- It helps in the synthesis of the cell membrane, replication of DNA, and protein synthesis.
- It also involved in septum formation during cell division.
- It perform the function of mitochondria in bacteria.

361. The cells of the bacterium Streptococcus remain arranged in the form of:

(a) irregular cluster (b) chain
(c) plate (d) cube

VMMC-2006

Ans. (b) : Streptococci are Gram-positive, non-motile non-spore forming, catalase-negative bacteria that occur in pairs or chains. Most Streptococci are facultative anaerobes and some are obligate anaerobes. The cells of the bacterium Streptococcus remain arranged in the chain form of different length.



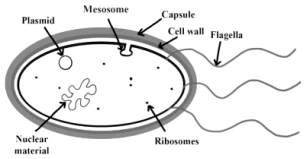
362. Infolding of plasma membrane in gram (+ve) bacterial cell is called :

(a) mesosome (b) reticulum
(c) lamellae (d) cristae

Rajasthan PMT-1998

Ans. (a) : Mesosomes is a convoluted membranous structure formed in prokaryotic cell by the invagination of the plasma-membrane.

- It helps in the synthesis of the cell membrane, replication of DNA and protein synthesis.
- It also involved in septum formation during cell division.
- It perform the function of mitochondria in bacteria.



Mesosome

363. Witches broom disease is caused by:

(a) Fungus (b) Mycoplasma
(c) Bacteria (d) Mineral

JCECE-2005
Manipal-2000
Rajasthan PMT-1998

Ans. (b) : Witch-broom disease is a type of disease caused by stress or Mycoplasma. In this, there's a dense mass of shoots from one point, this results in a structure resembling a broom.

364. Which kingdom incorporates photoautotrophs, chemoautotrophs and heterotrophs ?

(a) Monera (b) Protista
(c) Plantae (d) Both (b) and (c)

BCECE-2009
CG PMT-2007
AMU-1999

Ans. (a) : The kingdom Monera incorporates photoautotrophs, chemoautotrophs and heterotrophs. Some organisms belonging to kingdom Monera have an autotrophic mode of nutrition which means that they can prepare their own food while others are heterotrophic which depends on others for food.

- Mode of nutrition of all organisms belonging to kingdom Monera is autotrophic.
- Chemoautotroph do not require light and pigment for their nutrition. These bacteria oxidize certain inorganic substances with the help of atmospheric O_2.

365. Blue-green alga are included in:

(a) protista (b) fungi
(c) prokaryotes (d) bryophytes

Uttarakhand-2005

Ans. (c) : Prokaryotes are organisms whose cells lack a nucleus and other organelles.

- Most of the bacteria are single celled small organisms that have a relatively simple structure.
- Prokaryotes include the domains Eubacteria and Archaea. Thus example of prokaryotes include bacteria, archaea, and cyanobacteria.

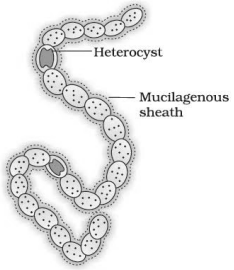
366. Heterocysts are found in

(a) Cyanophyceae (b) Chlorophyceae
(c) Pheophyceae (d) Rhodophyceae

Haryana PMT-2007
J & K CET-2000

Ans. (a) : Heterocyst are found in many species of filamentous blue-green algae. They are cells of slightly larger size and with more thickened wall than the vegetative cells.

- It is a transparent thick - walled cell seen in blue-green algae filaments at an intermediate position.



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367. The outer face of outer membrane of Gram-negative bacteria having
(a) mycoic acid (b) teichoic acid
(c) lipopolysaccharides (d) peptidoglycan
VMMC-2014

Ans. (c) : Gram-negative bacteria are surrounded by a thin peptidoglycan cell wall which itself is surrounded by an outer membrane containing lipopolysaccharide.
• It forms an impermeable barrier for various antimicrobial protiens of the immune system.

368. Which of the following does not evolve oxygen?
(a) Autotrophic plants
(b) Green algae
(c) Blue-green algae
(d) Photosynthetic bacteria
JIPMER-2001

Ans. (d) : Some bacteria are photosynthetic which convert energy from sunlight into another form of energy they can use to grow.
• Photosynthetic bacteria contain different photosynthetic pigments.
• None of the anoxygenic phototrophic bacteria have the ability to use water as an electron donor and thus perform photosynthesis using sulfide hydrogen or organic substance. Therefore photosynthesis by these bacteria does not involve oxygen.

369. Organism without any specific shape are
(a) mycoplasm (b) bacteria
(c) viruses (d) cyanobacteria
Manipal-2013

Ans. (a) : Organism without any specific shape are mycoplasma. Mycoplasmas are a group of pleomorphic micro-organisms characterized by lack of cell wall and ability to form colonies on agar agar resembling tiny fried eggs.
• Mycoplasma is a genus of bacteria that like the other membrane of the class mollicutes.

370. Botanical name of 'gram' is
(a) *Cicer arietinum* (b) *Phaseolus aurens*
(c) *Lablab purpureus* (d) Dolichos
BHU PMT (Mains)-2008

Ans. (a) : *Cicer arietinum* is the botanical name of the gram belongs to family Fabaceae.
• Its different types are variously known as gram or Bengal gram, chana etc.

371. The shape of the cocci bacteria is
(a) rod (b) spherical
(c) comma (d) spiral
AMU-2012

Ans. (b) : A coccus is any bacteria or archaeon that has a spherical, ovoid, or generally round shape staphylococcus bacteria form clusters of cells that resemble grapes. They seem spherical (cocci) when observed under the microscope and create grape -like groups.

372. Black rot of crucifers is caused by a
(a) fungus (b) bacterium
(c) virus (d) None of these
AMU-2012

Ans. (b) : Black rot is caused by a bacteria *Xanthomonas campestris* that can infect most crucifer crops at any growth stage.
• This bacteria can infect any plant in the Brassica family.

373. All are true about bacterial endospores except
(a) sporulation in bacteria is a method of reproduction
(b) spores of all the medically important bacteria are killed by autoclaving at 121°C for 15 minutes
(c) spores can be stained by modified Ziehl-Neelsen technique
(d) bacterial spores help them to survive under favourable conditions
BHU PMT (Screening)-2011

Ans. (a) : The cells of the bacteria, plant or fungi which are created when an organism encounter harsh conditions are called spores. These spores have a thick cell wall which helps them to with stand harsh conditions. They preserve the organisms genetic material and resume multiplying once favourable conditions are available.
The formation of these spores is known as sporulation.

374. E. coli lives in human intestine and cause
(a) urinary tract infection in infants only
(b) diarrhoea only adults
(c) meningitis
(d) None of the above
BHU PMT (Screening)-2011

Ans. (d) : *Escherichia coli* is a gram-negative, facultative anaerobic, rod- shaped coliform bacterium of the genus Escherichia that is commonly found in the intestine of warm blooded organisms.
• They live naturally in intestinal tract and helps in digestion of food.

375. Many bacteria are now resistant to penicillin because
(a) penicillin cause gene mutations
(b) previously resistant forms survived and reproduced better than non-resistant forms
(c) hospital environment inhibits competition among bacteria
(d) penicillin triggers the synthesis of resistant proteins
BHU PMT (Screening)-2011

Ans. (b) : Penicillins are used to treat infections caused by bacteria. They work by killing the bacteria or preventing their growth. So bacteria with resistant gene from penicillin transferred character to offspring.
• Some bacteria have developed resistance to antibiotics that were once commonly used to treat them.

376. A bacterium is capable of withstanding extreme heat, dryness and toxic chemical. This indicates that it is probably able to form
(a) a thick peptidoglycan wall
(b) endospores
(c) endotoxins
(d) endogenous buds
Manipal-2009

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Ans. (b) : Bacterial endospores are simplified form of bacteria consisting of the DNA genome, Bacillus and the Clostridium are the main two genera of bacteria that form endospores.

• The endospore are formed in response to unfavourable growth conditions in the bacterial environment most commonly induced by the limitaion of nutrients.

377. An example for symbiotic bacteria

(a) *Erwinia amylovora*
(b) *Rhizobium leguminosarum*
(c) *Xanthomonas campestris*
(d) *Agrobacterium tumefaciens*

DUMET-2009

Ans. (b) : *Rhizobium leguminosarum* is the bacteria that live in symbiotic association with the root nodules of the leguminous plants.

- Fixation of nitrogen cannot be done independently.
- Nitrogen fixation helps in increasing soil productivity and soil fertility.
- Rhizobium infects the roots of leguminous plants. They are usually found in the soil and produce nodules after infecting the roots of the leguminous plants.

378. Which of the following bacteria is found in colon of human?

(a) E. coli (b) M. tuberculosis
(c) C. botulinum (d) Azotobacter

VMMC-2010

Ans. (a) : *Escherichia coli* is a Gram-negative rod shape bacteria.

- It is commonly found in the lower intestine of warm blooded organism.
- It is peritrichous bacteria i.e. flagella are present in the whole body.
- E. coli has several practical uses besides its use as a vector for genetic experiments and processes.

379. Leprosy is due to:

(a) TMV (b) Monocystis
(c) Salmonella (d) Mycobacterium

Haryana PMT-2003

Ans. (d) : Leprosy is a disease that causes severe scarring skin sores and causes more damage in the limb.

- It mainly affects the peripheral nerves, skin, respiratory tracts and eyes.
- Leprosy is actually not that infectious but it spreads when a healthy person comes in regular and close contact with nasal mucosa droplets of leprosy patients.

380. Where does meiosis occur in blue green algae/bacteria?

(a) Zygote (b) Zygospore
(c) Akinete (d) None of these

CG PMT-2011

Ans. (d) : Meiosis doesn't occur in blue-green algae and bacteria as they are prokaryotes, their reproduction is via asexual processes and these processes are binary fission or mitosis.

381. Cyanobacteria differs from other groups of bacteria in their

(a) DNA (b) Cell wall
(c) Nutrition (d) Reproduction

CG PMT-2010

Ans. (c) : Cyanobacteria known as blue-green algae. They are photosynthetic, microscopic organisms that are technically bacteria.

- Cyanobacteria possess chlorophyll- a while most bacteria do not contain chlorophyll.
- Bacteria are mainly heterotrophs while the Cyanobacteria are autotrophs.
- Both bacteria and cyanobacteria are prokaryotes.
- Cyanobacteria are Gram-negative bacteria.

382. Instead of chromosome which of the following has only DNA

(a) Anabaena and E. coli
(b) Volvox
(c) Chlamydomonas
(d) Plasmodiophora and Cystopus

CMC Vellore-2014

Ans. (a) : The prokaryotes, which have only DNA are Anabaena and E.coli. in these organisms, chromosomes are not formed as histone is absent.

383. Which type of ribosomes are found in Nostoc cells?

(a) 50 S (b) 60 S
(c) 70 S (d) 80 S

CMC Vellore-2014

Ans. (c) : Prokaryotes contains 70S ribosomes while eukaryotes have 80S ribosomes. The cytoplasmic ribosomes of prokaryotes (blue-green algae, bacteria and PPLO) are 70S.

• Nostoc is a prokaryotic organism, 70S ribosome are mainly found.

384. Bacterial chlorophyll absorbs mainly:

(a) infra red light (b) visible light
(c) UV rays (d) X-rays

VMMC-2003

Ans. (a) : Chlorophyll is the primary pigment involved in absorbing sunlight to capture energy for photosynthesis. Bacterial chlorophyll absorbs mainly infra red light. There are many different types of pigments in nature but chlorophyll is unique in its ability to enable plants to absorb energy to build tissues.

385. Bacteria in cold climate can live for:

(a) few years (b) 1,000 years
(c) 2, 000 years (d) many thousand year

AFMC-2001

Ans. (d) : Bacteria can survive thousands of years in cold climate. These microbes are called psychrophiles which means cold loving. They survive in extremely cold environments with the help of cold shock proteins.

386. The disease caused by mycoplasma is :

(a) Papaya bunchy top
(b) Brinjal little leaf
(c) Witches broom of potato
(d) all of the above

Rajasthan PMT-2000

Ans. (d) : The bunchy top of the papaya is caused by Phytoplasma. They are the bacterial parasites that are similar to mycoplasma.

@apna_pdf

- The little leaf disease is caused by the Phytoplasma in the brinjal plant.
- Witches broom disease is a type of disease caused by stress or mycoplasma.

387. The inner most membrane of gram (-) negative bacteria is consist of :

(a) mucopeptide (b) lipoprotein
(c) phospholipid (d) lipopolysaccharides

Rajasthan PMT-2000

Ans. (b) : The inner most membrane of gram negative bacteria is plasma membrane which consist of lipoprotein while outer cell wall which consist of mucopeptide. Cytoplasm of all bacteria cells are surrounded by an inner membrane composed of phospholipids which is enclosed by the cell wall a macromolecular network of peptidoglycan that is single layered.

- The outer membrane of Gram-negative bacteria contains lipo-polysaccharides, proteins and phospholipids.

388. Which one of the following is detrimental to soil fertility?

(a) Saprophytic bacteria (b) Nitrosomes
(c) Nitrobacter (d) Pseudomonas

KVPY SA-2015

Ans. (d) : The denitrifying bacteria are microorganisms whose actions results in the conversion of nitrates in soil to free atmospheric nitrogen, thus depleting soil fertility and reducing agricultural productivity. Hence, Pseudomonas are denitrifying bacteria.

389. Product of photosynthesis in blue-green algae is

(a) glycogen like (b) glucoside
(c) globulin (d) glycerol phosphate

AMU-2002

Ans. (a) : Cyanobacteria is autotrophic eubacteria and make their food with the help of oxygen present in water.

- The cell structure in cyanobacteria is typically prokaryotic.
- Photosynthetic pigment of cyanobacteria is chlorophyll A and β-carotene and reserve food material is cyanophycean starch like glycogen.

390. Aerobic bacteria found in hot sulphur springs are termed as

(a) halophiles (b) thermoacidophiles
(c) chemolithotrophic (d) None of the above

AMU-2001

Ans. (b) : The microorganisms that have developed mechanism to successfully persist in hot, acidic environments are known as thermoacidophiles.

- Thermoacidophiles like Thermoplasma and Thermoproteus are the archaebacteria which have the two fold ability to tolerate a high temperature as well and acidic environment.
- They are habitually found in acidic sulphur springs where the temperature may exceed 80°C and pH be as low as 2.
- They are chemosynthetic as they obtain energy by synthesizing food from oxidizing sulphur to sulphuric acid.

391. The bacteria oxidising a number of inorganic compounds to obtain energy for the assimilation of CO_2 are called

(a) photoautotrophic bacteria
(b) chemoautotrophic bacteria
(c) heterotrophic bacteria
(d) None of the above

UP CPMT-2011 / AMU-2001

Ans. (b) : Chemoautotrophs are organisms that obtain energy by oxidation of inorganic compounds in their environment.

- Chemoautotrophs are able to thrive in very harsh environments such as deep sea vents, due to their lack of dependence on outside sources of carbon other than carbon dioxide.

392. Which of the following statements is not true for Nostoc ?

(a) It is prokaryotic (b) It is autotrophic
(c) It is filamentous (d) It is macroscopic

Karnataka CET-2012

Ans. (d) : Nostoc is a genus of blue-green algae or cyanobacteria. They are prokaryotic and perform photosynthesis. Nostoc are filamentous and unbranched. They have chlorophyll pigments. These pigments allows the organism to prepare its own food. They are autotrophic. Nostoc are the microscopic blue-green algae. Thus, the correct answer is option (d) because it is a microscopic not a macroscopic.

393. Xanthomonas citri possesses:

(a) tuft of flagella (b) bipolar flagella
(c) single polar flagellum (d) no flagella

AP EAMCET-2002

Ans. (c) : Xanthomonas citri is a gram-negative bacterium, further classified as rod-shaped protobacteria. It is motile by means of a single polar flagellum. It mainly affects the citrus plans. It causes citri pathogenesis and citrus canker disease in citrus species like lime.

394. Murein is not found in the cell wall of …….

(a) Cyanobactria (b) Diatoms
(c) Nostoc (d) Eubacteria

Karnataka CET-2004

Ans. (b) : Murein (peptidoglycan) found in cell wall of cyanobacteria & eubacteria. Nostoc is a genus of cyanobacteria. Diatoms are photosynthetic protist, wall of diatoms rich in silica and other minerals. Hence murein is not found in the cell wall of diatoms.

C. Protista

395. Contractile vacuole in protozoan Amoeba is meant for

(a) respiration (b) excretion
(c) locomotion (d) osmoregulation

UP CPMT-2012,2011,2008
Rajasthan PMT-2011, 2008, 2007, 2004, 2000, 2002, 1998
JCECE-2010 / Punjab MET-2008 / AIPMT-2002, 1991
CG PMT-2008/ Karnataka CET-2005
Manipal-2001/ AIIMS-1996

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Ans. (d) : The process of osmoregulation which is the maintenance of water and salt balance is done with the help of contractile vacuole. It can be observed in unicellular organism such as Paramecium and Amoeba.

• Contractile vacuole protect a cell from absorb to much water and excreting excess water.

396. Passive food ingestion in Amoeba is known as :

(a) import (b) invagination
(c) circumfluence (d) circumvallation

BVP-2012, 2007 / CGPMT-2010
Manipal-2008 / Uttarakhand PMT-2008
MGIMS Wardha-2006

Ans. (a) : Passive food ingestion in Amoeba is known as **import,** which is basically endocytosis (taking in of food on contact)**.**

397. A bite of tse- tse fly may pass to humans

(a) Leishmania donovani
(b) Trypanosoma gambiense
(c) Entamoeba histolytica
(d) Plasmodium vivax.

AFMC-2003
Rajasthan PMT-2003
Karnataka CET-2000
AIPMT-1991, 1989

Ans. (b) : *Trypanosoma gambiense* is a parasitic zooflagellate spread by the tse-tse fly (*Glossina palpalis*) that cause the most deadly disease in humans known as **sleeping sickness or trypanosomiasis**. The disease is common in the humid and sub-humid regions of the African continent.

398. The infective stage of malarial parasite, Plasmodium that enters human body is

(a) merozoite (b) sporozoite
(c) trophozoite (d) minuta form

WBJEE-2011
DU MET-2008, 2005, 2001
Punjab MET-2003 / JIPMER-1996
AIPMT-1990

Ans. (b) : Sporozoites represent the infectious stage, which enters the human blood stream with saliva and undergoes schizogony. Sporozoites are small, spindle-shaped unicellular organisms that are present in the salivary glands of mosquitoes.

399. Amoeba differs from Entamoeba in having

(a) contractile vacuole (b) pseudopodia
(c) ectoplasm (d) cytostome

JIPMER-2010 /AMU-2009, 2002
Punjab MET-2008 / UPCPMT-2006

Ans. (a) : The maintenance of water balance within the body i.e. osmoregulation is done by contractile vacuoles. These are found in the cytoplasm of organisms living in hypotonic water. Amoeba is a good example of such type of organism.

400. Mild tertian malaria is caused by

(a) Plasmodium vivax
(b) Plasmodium ovale
(c) Plasmodium falciparum
(d) Plasmodium malaria

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : Mild tertian malaria is caused by *plasmodium ovale* is a species of parasitic protozoa. It is a parasite that infect humans and characterises by fever which occurs every third day.

401. The following is comparable to a professional dinner guest

(a) Competitive organism (b) Commensal
(c) Parasite (d) Predator

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : Parasite is comparable to a professional dinner guest. Parasite is an organism that lives on the surface or inside another organism and feeds on it. The organism that is benefitted is called the parasite. Taperworms and fleas are example of parasites.

402. Free living microorganism that feed on organic detritus and an example

(a) Parasites, Salmonella
(b) Saprophytes, Bacillus
(c) Parasites , Rhodospirillum
(d) Saprophytes, Xanthomonas

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : Saprophyes are the living organisms that live and feed on dead and decaying organisms. They break down the complex organic matter into simpler substances that are taken up by the plants for various metabolic activities. They also feed on nonliving organic matter known as detritus. Although they feed on the dead, decaying or decomposed matter. Saprophyter however, are living organisms. Example of it is 'Bacillus'.

403. Identify the Protozoan with anematic flagellum

(a) Chilomonas & Cryptomonas
(b) Euglena & Astasia
(c) Peranema & Monas
(d) Chlamidononas & Politoma

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : Protozoan with anematic flagellum are chilomonas and cryptomonas.

When flagellum is simple without mastigonomes and the distal end of the flagellum ends as a terminal 'naked' axial filament it is called anematic flagellum.

404. Protozoan in which cilia are confined only to juvenile stages are

(a) Paramecium (b) Vorticella
(c) Acineta (d) Euglena

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : *Acineta locustris* is a freshwater suctorian protozoan in which cilia are confined only to juvenile stages.

405. The diploid stage in the life cycle of Plasmodium vivax is

(a) Sporozoite (b) Cryptozoite
(c) Metacryptozoite (d) Ookinete

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : The ookinete is one of the most important stages of plasmodium development in the mosquito.

The zygotes in turn become motile and elongated (ookinetes) which invade the midgut wall of the mosquito where they develops into oocystes.

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406. Which of the following is not correct in relation to sporogony of Plasmodium?

(a) Formation of sporozoites in the oocysts is called sporogony
(b) Sickle shaped sporozoites are formed
(c) Oocyst with sporozoites is called sporocyst
(d) The nucleus of the oocyst first under goes mitotic division

AP EAPCET-12.07.2022 Shift-I

Ans. (d) : Plasmodium sporogony is an extra cellular phase of asexual replication, asexual reproduction take place inside the Anopheles mosquito in case of malaria
• In this stage, the oocyte of the parasite undergoes multiple mitotic division to give rise to infective sporozoites.

407. Which of the following statements are correct in relation to host and parasites?

i) The host in which parasites undergoes asexual reproduction is secondary host
ii) Female Culex mosquito is the primary host for wuchereria
iii) In primary host parasite undergoes sexual reproduction
iv) Man is the primary host for plasmodium
v) The host that loves the infective stages of a parasite in its body when the main host is not available is called Reservoir host

(a) Only (ii), (iii) and (iv) are correct, (i) and (v) are wrong
(b) Only (i), (iii) and (v) are correct, (ii) and (iv) are wrong
(c) Only (i) and (v) are correct but (ii), (iii) and (iv) are wrong
(d) Only (ii) and (iv) are correct, remaining are wrong

AP EAPCET-12.07.2022 Shift-I

Ans. (b) :
(i) Female mosquito culex is secondary host of wuchereria not primary-host.
(ii) Man is secondary host of Plasmodium primary-host female anopheles.

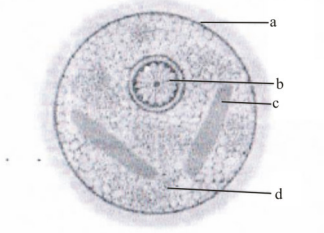
408. Undulipodia are

(a) Flagella and cilia of protozoans
(b) Cilia and pseudopodia of protozoans
(c) Flagella and pseudopodia of protozoans
(d) Pseudopodia and myonemes

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Unduplipodia are basically synonymous to flagella and cilia. They are also called 9+2 organelle, is a motile filamentous extracellular projection of eukaryotic cells.

409. In the given diagram of the cystic stage of Entamoeba identify parts labeled as a, b, c, d and select the option?



(a) a → cyst wall, b → Nucleus, c → Glycogen granule , d → Chromatoid bar
(b) a → Nucleus, b → Cyst wall, c → Glycogen granule, d → Chromatoid bar
(c) a → cyst wall, b → Nucleus, c → Chromatoid bar, d → Glycogen granule
(d) a → cyst wall, b → Nucleus, c → Glycogen granule, d → Chromatoid bar

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : There are three stages in the life cycle of Entamoeba, trophozoite, pre-cystic and the cystic stage. The cystic stage is a rounded form with protective cyst wall and it has four nuclei.

410. In parasitic castration_____

(a) Gonads of the host degenerate
(b) Size of the Gonads of the host increases
(c) No change in the Gonads of the host
(d) Gonads of the parasite degenerate

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : The parasitic castration is the degeneration of gonads of the host making it sterile. For example- *Sacculina* causes the degenerative of ovaries in the crab *Carcinus maenas*.

411. Multicellular animals that exhibit cellular level organisation are

(a) Protozoans (b) Metazoans
(c) Eumetazoans (d) Parazoans

TS EAMCET-30.07.2022 Shift-II

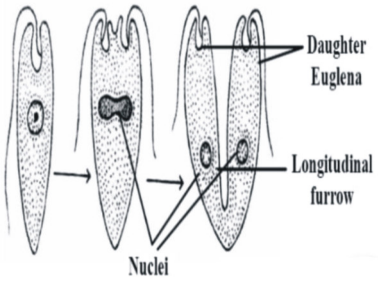
Ans. (d) : Parazoans exhibits cellular level organization.
• The Parazoans are animals whose body consists of loosely aggregated cells. They have a cellular level of organization in which cells are not organized into tissues.

412. Which of the following divide during binary fission of Euglena?

(a) Nucleus, flagellum and stigma
(b) Nucleus, kinetosomes and contractile vacuole
(c) Nucleus, stigma and chromatophores
(d) Nucleus, kinetosomes and chromatophores

AP EAPCET-12.07.2022 Shift-I

Ans. (d) : The division of binary fission of Euglena occurs in nucleus, kinetosomes and chromatophores.
• Euglena reproduces through asexual reproduction by the process of binary fission.
• Binary fission is a process of mitosis and two repeated sets of daughter cells are formed.
• Euglena reproduce asexually by longitudinal binary fission.



Binary Fission in Euglena

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413. Which of the following stages of Plasmodium are commonly found both in human being and mosquito, in its life cycle ?
(a) Sporozoites and gametes
(b) Gametocytes and gametes
(c) Gametocytes and sporozoites
(d) Sporozoites only

TS EAMCET-30.07.2022 Shift-II

Ans. (c) : Gametocyte and sporozoites stages of plasmodium are commonly found both in human being and mosquito in its life cycle. Sporozoite stage are infectious stage for human beings, entered when mosquito bites. While gametocyte transmit from mammalian host to the mosquito.

414. Digenetic cytozoic parasite is
(a) Plasmodium (b) Wuchereria
(c) Entamoeba (d) Nosema

TS EAMCET-30.07.2022 Shift-II

Ans. (a) : Plasmodium is a digenetic cytozoic parasite. It is a causative agent of malaria. It requires two hosts to complete life cycle - an invertebrate female anopheles mosquito as its primary host and a vertebrate (man) as its secondary or intermediate host.

415. Organism "A" lives as a parasite in the body of an organism "B", "C" is another organism lives as a parasite in the body of "A" then C is
(a) Ectoparasite (b) Digenetic parasite
(c) Hyperparasite (d) Commensal

TS EAMCET-31.07.2022 Shift-I

Ans. (c) : Hyperparasite: A parasite that lives in or on another parasite. The most common examples are insects that lay their eggs inside or near parasitoid larvae.
- The Ectoparasite that live on external surface of the host organism. Example– Tick on dog, human hair, cuscuta.
- Digenetic parasite complete life cycle in two host. eg. liver fluke- (F-hepatica)
- Commensal one species benefitted and other is neither benefitted nor harmed.

416. Transformation of merozoites of Plasmodium into gametocytes takes place when the erythrocytes are in
(a) Liver (b) Kidney
(c) Bone marrow (d) Lymph

TS EAMCET-31.07.2022 Shift-I

Ans. (c) : Transformation of merozoites of Plasmodium in to gametocyte takes place when erythrocyte are in bone marrow.
- The merozoites involve in the erythrocyte (red blood cell) to form trophozoites, schizonts and gametocytes shows symptoms of malaria.
- The liver stage of parasite during which parasite goes to producing infection of liver.
- The malaria parasite develop in lymph node and infect blood cells.

417. Assertion (A): Entamoeba histolytica is an obligate anaerobe.
Reason(R): Mitochondria are absent in it.
The correct option among the following is
Options:
(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : *Entamoeba histolytica* is an anaerobic parasite that is found in the colon.
- Mitochondria is absent in the endoplasm of *Entamoeba histolytica* which indicates the obligate anaerobic nature of Entamoeba.

418. Actinophrys has
(a) Lobopodia (b) Filopodia
(c) Reticulopodia (d) Heliopodia

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : Actinophrys have many axopodia, called as helipodia, that radiate out from the body. These axopodia consists of a central, rigid rod which is coated in thin layer of ectoplasm and is rooted in the endoplasm to terminate there. These are used for mobility of cell fusion and division and for prey capture.

419. Statement I: The binary fission of Euglena is called homothetogenic fission because the daughter euglenae are like mirror images.
Statement II: Binary fission in Paramecium is known as perkinetal fission because it occurs at right angles to the kinetics.
(a) Both statement I and statement II are true
(b) Both statement I and statement II are false
(c) Statement I is true but statement II is false
(d) Statement I is false but statement II is true

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : The Euglena (Flagellates) exhibit a longitudinal, symmetrogenic fission. The Paramecium (Ciliates), on the other hand, basically divide in a point-by-point correspondence of parts, often seen as essentially transverse or perkinetal.

420. In which body part of female Anopheles mosquito, gametes of parasite plasmodium fertilise and develop?
(a) Salivary gland (b) Rectum
(c) RBC (d) Gut

GUJCET-2021

Ans. (d) : Plasmodium is a protozoan pathogens. It causes malaria in human pathogen and transmitted through bite of female Anopheles.
- Life cycle of Plasmodium in mosquito start when gametocyte develop into mature gamete within the gut of mosquito.

421. Match the following to effects of parasites on host ?

Parasite	Effect on host	Host effected
A) Sacculina	i) Hypertrophy	p) Sheep
B) Larva of Fasciola	ii) Hyperplasia	q) Snail
C) Plasmodium	iii) Parasitic castration	r) Carcinus
D) *Fasciola hepatica*	iv) Gigantism	s) Man

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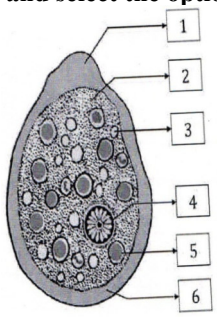
(a) (A–iii–r),(B–ii–p),(C–i–s),(D–iv–q)
(b) (A–iv–r),(B–ii–p),(C–i–s),(D–iii-q)
(c) (A–iii–r),–(B–iv–q),(C–i–s),(D–ii–p)
(d) (A–iii–r),(B–ii–p),(C–iv–s),(D–i–q)

AP EAMCET-06.09.2021 Shift-I

Ans. (c):

Parasite	Effect on host	Host effected
a) Sacculina	iii) Parasitic castration	r) Carcinus
b) Larva of Fasciola	iv) Gigantism	q) Snail
c) Plasmodium	i) Hypertrophy	s) Man
d) Fasciola hepatica	ii) Hyperplasia	p) Sheep

422. In the given diagram of the Trophozoite stage of entamoeba. Identify parts labelled as 1,2,3,4,5,6, and select the option ?



(a) 1– Pseudopodium, 2–Endoplasm, 3–Ribosome, 4– Cartwheel shaped nucleus,5–Food vacuole with RBC, 6– Ectoplasm
(b) 1– Pseudopodium 2–Ribosome, 3–Endoplasm, 4– Food vacuole with RBC, 5–Cartwheel shaped nucleus, 6– Ectoplasm
(c) 1– Pseudopodium, 2– Endoplasm, 3–Ribosome, 4– Food vacuole with RBC, 5–Cartwheel shaped nucleus, 6– Ectoplasm
(d) 1– Pseudopodium, 2– Ectoplasm, 3–Ribosome, 4– Cartwheel shaped nucleus, 5–Food vacuole with RBC, 6– Endoplasm

AP EAMCET-06.09.2021 Shift-I

Ans. (a): The protozoan *Entamoeba histolytica* causes Amoebiasis. The trophozoite stage is the infective stage of Entamoeba and also the activated feeding stage in the life cycle.

423. Choose the correct statements related of binary fission of Paramecium?

(i) During favorable conditions Paramecium stops feeding after attaining its maximum growth
(ii) At first the micronucleus divides by amitosis and the macronucleus divides into two daughter nuclei by mitosis
(iii) The proter receives the anterior contractile vacuole, cytopharynx and cytostome from its parent individuals
(iv) Before karyokinesis a transverse constriction appears in the middle of the body

(a) Except (iv) all are correct
(b) Except (ii) all are correct
(c) Except (ii) and (iv) all are correct
(d) Only (i) is correct

AP EAMCET-06.09.2021 Shift-I

Ans. (c): During favorable condition, Paramecium stops feeding after attaining its maximum growth and multiplies three times a day. The proter receives the anterior contractile vacuole, cytopharynx and cytosome from its parent individual.

424. In which of the animals dimorphic nucleus is found?

(a) Paramecium caudatum
(b) Amoeba proteus
(c) Plasmodium vivax
(d) Trypanosoma gambiense

AP EAMCET-06.09.2021 Shift-I
AIPMT-2002

Ans. (a): The *Paramecium caudatum* shows diamorphic nucleus. There are two type of nuclei, macronucleus, it is large, bean-shaped, polypoid, vegetative nucleus whereas micronucleus, it is small, rounded, diploid, reproductive nucleus.

425. The daughter paramecia formed immediately after binary fission are

(a) Mirror images (b) Proter and opisthe
(c) Genetically different (d) Identical

TS EAMCET-10.08.2021 Shift-I

Ans. (b) : After binary fission daughter Paramecia are formed. Anterior one daughter Paramecia called **proter** and the posterior Paramecia are called **opisthe.**

426. All protozoans are / have ————

(a) Pseudopodia
(b) Contractile vacuole
(c) Holozoic nutrition
(d) Eukaryotic organization

AP EAMCET-03.09.2021 Shift-I

Ans. (d) : The Protists are unicellular eukaryotes and the protozoans are classified under Protista. These protozoans belong to Protista group of R.H. Whittaker's five kingdom classification.

427. Match the following related to parasites ?

Parasite		Disease Caused	
i.	*Trypanosoma gambiense*	A.	Delli boils/oriental sores/Tashkent ulcers
ii.	*Wuchereria bancrofti*	B.	Malaria
iii.	*Leishmania donovani*	C.	African sleeping sickness
iv.	Plasmodium sps.	D.	Elephantiasis
v.	*Leishmania tropica*	E.	Kala azar/Dum dum fever/Visceral Leishmaniasis

Options:

(a) (i-C), (ii-D), (iii-A), (iv-B) ,(v-E)
(b) (i-D), (ii-C), (iii-A), (iv-B) , (v-E)
(c) (i-C), (ii-D), (iii-E), (iv-B) , (v-A)
(d) (i-D), (ii-B), (iii-A), (iv-C) , (v-E)

AP EAMCET-03.09.2021 Shift-II

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Ans. (c) :

	Organism		Disease
(i)	*Trypanosoma gambiense*	:	African sleeping sickness
(ii)	*Wuchereria bancrofti*	:	Elephantiasis commonly affect lymphatic vessel of lower limb
(iii)	*Leishmania donovani*	:	Kala azar/dum-dum fever
(iv)	Plasmodium sps.	:	Malaria
(v)	*Leishmania tropica*	:	Delli boils/oriental sores/ Tashkent Ulcer.

428. Assertion (A): Symmetrogenic binary fission takes place in paramecium
Reason (R): The cytopharynx of the parent is retained by the proter
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not the correct explanation of A
(c) Both A and R are wrong
(d) A is wrong but R is correct

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : Symmetrogenic binary fission take place in amoeba.
• Binary fission is a mode of asexual reproduction, the cell broken down in two daughter cell.
• Binary fission take place in favourable condition.

429. Match the following related to evolution of Pseudopodia?

List-I	List-II	List-III
i. Locopodia	A. Net–like	p. Actinophrys
ii.Filopodia	B. Sun ray–like	q. Elphidium
iii.Reticulopodia	C. Blunt finger like	r. Euglypha
iv. Axopodia	D. Fibre–like	s. Entameoba

(a) (i–C–r), (ii–A–s), (iii–D–q), (iv–B–p)
(b) (i–C–s), (ii–A–r), (iii–D–q), (iv–B–p)
(c) (i–C–s), (ii–D–r), (iii–A–q), (iv–B–p)
(d) (i–C–s), (ii–D–q), (iii–D–r), (iv–B–p)

AP EAPCET-07.09.2021 Shift-I

Ans. (c) :

List-I	List-II	List-III
(i) Locopodia	Blunt finger-like	(s) *Entamoeba*
(ii) Filopodia	Fiber-like	(r) *Euglypha*
(iii) Reticulopodia	Net-like	(q) *Elphidium*
(iv) Axopodia	Sun ray-like	(p) *Actinophrys*

430. The interval between the first entry of plasmodium into the blood of man in the form of sporozoites and its second entry in the form of cryptozoites is called-
(a) Incubation period (b) Latent period
(c) Prepatent period (d) Window period

AP EAPCET-07.09.2021 Shift-I
TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Prepatent period: - The interval between the first entry of Plasmodium into blood of man in the form of sporozoites and its second entry in the form of cryptozoites is called **prepatent period.**

431. Match the following regarding the life cycle of plasmodium vivax. The correct combinations are _____

	Stage	Cycle	Product
i.	Sporozoite	Pre erythrocytic cycle	Cryoptozoites
ii	Cryptozoite	Exoerythrocytic cycle	Metacryptozoites
iii	Merozoite	Erythrocytic cycle	Merozoites
iv	Gametocyte	Gametogony	Gametes

Options:
(a) (i) & (ii) only (b) (ii) & (iii) only
(c) (i), (ii) & (iii) only (d) (i), (ii), (iii) & (iv)

AP EAMCET-05.10.2021 Shift-I

Ans. (d) : Life cycle of p-vivax

	Stage	Cycle	Product
i.	Sporozoite	Pre-erythrocytic cycle	Cryptozoites
ii	Cryptozoite	Exo-erythrocytic cycle	Meta-cryptozoites
iii	Merozoite	Erythrocytic cycle	Merozoites
iv	Gametocyte	Gametogony	Gametes

432. Which among the following is 'Photosynthetic Protozoa'?
(a) Euglena (b) Paramecium
(c) Plasmodium (d) Trypanosoma

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : Euglena is photosynthetic protozoa. It is a genus of single-cell flagellate eukaryotic protozoan.
• Euglena is photosynthetic in the presence of sunlight, when deprived of sunlight they behave like heterotrophs by predating on other tiny organisms.

433. Multiple fission in Amoeba is called
(a) Schizogony (b) Gametogony
(c) Sporogony (d) Sporulation

TS EAMCET-09.08.2021 Shift-I
BCECE-2004

Ans. (d) : Multiple fission in Amoeba is called **sporulation.** Amoeba reproduces by multiple fission during unfavourable conditions. It secretes three-layered protective cyst and the nucleus divides repeatedly to form several daughter nuclei. Each daughter nucleus with a small amount of cytoplasm forms a daughter Amoeba.

434. Arrange the following statement regarding Amoebiasis infection:
(1) The trophozoites multiply by binary fission and produce cysts and both stages are passed in the faeces
(2) Trophozoites migrate to the large intestine
(3) Excystation occurs in the small intestine and trophozoites are released

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(4) Infection by *Entamoeba histolytica* occurs by ingestion of mature cysts in fecally contaminated food, water, or hands

(a) 1 – 3 – 2 – 4 (b) 4 – 3 – 2 –1
(c) 4 – 2 – 3 –1 (d) 2 – 3 – 4 –1

AP EAMCET-24.09.2020 Shift-I

Ans. (b) : Cysts are found in formed stool whereas trophozoites are found mainly in diarrheal stool. The infection with *Entamoeba histolytica* occurs via ingestion of mature cysts from focally contaminated food, water, etc. the exposure to infectious cysts and trophozoites in fecal matter can occur due to sexual contact also.

• The excystation occurs in small intestine and then the trophozoites migrate to large intestine, where they multiply by binary fission and produce cysts.

435. The vigour and vitality lost due to repeated binary fissions in ciliates is restored by

(a) Conjugation (b) Syngamy
(c) Multiple fission (d) Sporogony

TS EAMCET-29.09.2020 Shift-I

Ans. (a) : The vigour and vitality lost due to repeated binary fission in ciliates is restored by conjugation. The process which involve temporary union between two bacteria bearing ciliates on their outer surface belonging to two different mating types is known as **conjugation.**

436. Pseudopodia is mainly seen in _____

(a) Flat Worm (b) Euglena
(c) Amoeba (d) Paramecium

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : A temporary arm-like projection of a eukaryotic cell membrane that is emerged in the direction of movement is pseudopodium.

• It primarly consist of actin filaments and may also contain microtubules and intermediate filaments. Pseudopods are used for motility and ingestion.They are often found in Amoeba.

437. Match the following

Type of Parasite	Example
A) Cytozoic	I) Ascaris
B) Histozoic	II) Pediculus
C) Coelozoic	III) Plasmodium
D) Ectoparasite	IV) Cancer
	V) Wuchereria

The correct match is

	A	B	C	D
(a)	II	I	V	III
(b)	III	IV	I	II
(c)	III	V	I	II
(d)	IV	II	III	I

TS EAMCET-28.09.2020 Shift-II

Ans. (c) :

Type of Parasite		Example
(A) Cytozoic	-	(III) Plasmodium
(B) Histozoic	-	(V) Wuchereria
(C) Coelozoic	-	(I) Ascaris
(D) Ectoparasite	-	(II) Pediculus

438. Match the following :

Protozoan	Type of flagellum
A) Astasia	I) Pantonematic
B) Polytoma	II) Stichonematic
C) Chilomonas	III) Acronematic
D) Monas	IV) Anematic
	V) Pantachronematic

The correct match is

	A	B	C	D
(a)	II	III	V	I
(b)	V	III	I	II
(c)	II	III	IV	I
(d)	II	IV	III	I

TS EAMCET-28.09.2020 Shift-II

Ans. (c) :

Prozotoan's		Type of flagella
(A) Astasia	-	(II) Stichonematic
(B) Polytoma	-	(III) Acronematic
(C) Chilomonas	-	(IV) Anematic
(D) Monas	-	(I) Pantonematic

439. The following are the different stage in the cycle of Golgi of Plasmodium. Arrange them in correct sequence.

(I) Amoeboid state
(II) Trophozoite
(III) Erythrocytic merozoite
(IV) Schizont
(V) Signet ring stage

(a) III, IV, I, V, II (b) I, II, III, IV, V
(c) V, IV, III, I, II (d) II, V, I, IV, III

TS EAMCET-29.09.2020 Shift-II

Ans. (d) : Plasmodium is unicellular Protozoa. It causes malaria and form different stages.

• Sporozoites - Trophozoites - Signet - Ring Stage - Amoeboid Stage - Schizont - Erythrocytic Merozoite in blood- stream

440. Study the following and pick up the incorrect combinations

S. no	Parasite	Infective stage to man	Mode of infection
I	Plasmodium vivax	Sporozoite	Biting of male culex mosquito
II	Entamoeba histolytica	Tetranucleate cyst	Contamination of food and water
III	Ascaris lumbricoides	Miracidium	Contamination of food and water
IV	Wuchereria bancrofti	Third stage microfilaria	Biting of female Culex mosquito

(a) I, II (b) III, IV
(c) II, III (d) I, III

TS EAMCET-29.09.2020 Shift-II

Ans. (d) :

Parasite	Infective stage of man	Mode of infection
P.vivax	Sporozoite	Biting of female Anopheles
Entamoeba histolytica	Tetranucleate cycst	Contamination of food and water
Ascaris lumbricoides	Miracidium	Infect egg, contain second stage larva
Wuchereria bancrofti	Third stage microfilaria	Biting of female Culex mosquito

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441. Statement I: During binary fission in Paramecium, the daughter individual formed from the posterior part of the parent is called proter.
Statement II: Sporogony in Plasmodium is a type of multiple fission.
The correct option among the following is
(a) Both statements I and II are correct
(b) Both statements I and II are wrong
(c) Statement I is false and II is correct
(d) Statement I is correct and II is false

TS EAMCET-29.09.2020 Shift-II

Ans. (c) : During binary fission one paramecium cell divide into two cell macrouncleus and micronucleus genetically of spring of daughter cell . Micronucleus mitosis division and micronucleus amitotic.
• Sporogony in plasmodium is type of multiple fission.

442. Identify the typical angiosperm embryo sac from the following.
(a) 7 nucleate, 8 celled (b) 8 nucleate, 7 celled
(c) 8 nucleate, 8 celled (d) 8 nucleate, 6 celled

TS EAMCET-29.09.2020 Shift-II
Karnataka CET-2013

Ans. (b) : In angiosperm, the ovule contains embryo sac (female gametophyte) which develops from megaspore.
• The nucleus of megaspore divides mitotically and gives rise to 2-nucleate embryo sac.
• The embryo are seven cells; one central cell, two synergids, one egg cell and three antipodal cell.
• Six of the eight nuclei enclose by cell walls.
• Angiosperm embryo sac - 8 nucleated 7- celled.

443. Mastigophora is also known as_____
(a) Flagellata
(b) Ciliata
(c) Rhizopoda
(d) None of these options are correct

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : Mastigophora also known as **flagellate,** any group of protozoa mostly uninucleate organism one to many flagella for locomotion.
• Ciliata commonly known as cilliophora.
eg- Paramecium.
• Rhizopoda, are group of Protozoa and amoeboid organism placed in kingdom Protista. e.g.- Amoeba.

444. Protozoan are usually _____
(a) Multicellular
(b) Unicellular
(c) Tissue grade
(d) None of these options are correct

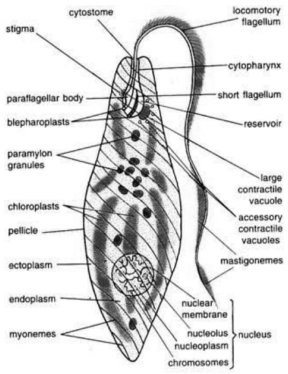
AP EAMCET-25.09.2020 Shift-I

Ans. (b) : Protozoa are unicellular eukaryotic heterotrophic organism.
• They are mostly either free living or parasites.
• Protozoa lack a cell wall.
• Protozoa that cause disease in animal and human.

445. Euglenoids are characterized by _____
(a) Flagellated, Pellicle, Eyespot
(b) Flagellated, Pellicle, Marine
(c) Pellicle, Eyespot, filamentous
(d) Fresh water, Pellicle, Eyespot

AP EAMCET-25.09.2020 Shift-I

Ans. (a) : Euglenoid are unicellular microorganism that belong to protista and algae.
• They are found in fresh water.
• They have both plant and animal-like features, that makes them difficult to classify and hence they are also known as connecting link between plants and animals.



Euglena

446. Match the column I and II

Column I	Column II
(i) Chrysophyte	**(A) Gonyaulax**
(ii) Dinoflagellate	**(B) Euglena**
(iii) Euglenoids	**(C) Diatom**
(iv) Slime moulds	**(D) Plasmodium**

(a) i – A, ii – C, iii – B, iv – D
(b) i – A, ii – D, iii – B, iv – C
(c) i – C, ii – B, iii – D, iv – A
(d) i – C, ii – A, iii – B, iv – D

AIIMS-25.05.2019 Shift-II

Ans. (d) :

(i) Chrysophyte	(C) Diatom
(ii) Dinoflagellate	(A) Gonyaulax
(iii) Euglenoids	(B) Euglena
(iv) Slime moulds	(D) Plasmodium

• Chrysophytes includes diatoms and golden algae (desmids). They are found in fresh water as well as in marine environments.
• Dinoflagellates are a group of unicellular protists. It is show character of both plants and animals. It is mostly marine. Some are photosynthetic autotrophs and some are heterotrops.
• Gonyaulax is a genus of dinoflagellates and commonly caused red tides.
• Euglenoids are unicellular microorganisms belongs to kingdom protista. Euglenoids shows features of both plant and animal.
• It is an unusual example of a unicellular animal with chlorophyll.
• Plasmodium Slime moulds are saprophytes that lack chlorophyll. During favorable condition slime moulds aggregates called plasmodium that can spread & wide, Spore formed by plasmodium during unfavourable condition.
The spores have true cell walls & are resistant to adverse conditions.

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447. The following are events in life cycle of plasmodium in female Anopheles

(A) Syngamy
(B) formation of gametes
(C) Oocyst formation
(D) Sporocyst formation
(E) Ookinete
(F) Zygote

Arrange them in correct sequence.

Options:

(a) D, C, E, F, A, B (b) B, A, F, C, E, D
(c) B, A, F, E, C, D (d) B, F, A, E, C, D

AP EAMCET-24.04.2019 Shift-II

Ans. (c) : Plasmodium parasite have complex life cycle.
Formation of Gametes (Gametocyte)– Male and female gametocyte inside the gut.
Synogamy– Fusion of two cells.
Zygote– Gametes development inside mosquitos stomach.
Ookinete– Elongated zygote involved in midgut wall of mosquito.
Oocyst Formation– After ookinete, it develop into oocysts.
Sporocyst Formation– Oocyst develop into sporocyst.

448. Match the following

List-I	List-II
(A) Isogamy	**(i) Trichonympha**
(B) Anisogamy	**(ii) Euglena**
(C) Hologamy	**(iii) Plasmodium**
(D) Conjugation	**(iv) Monocytes**
	(v) Paramecium

The correct answer is

Options:

	A	B	C	D
(a)	IV	III	V	I
(b)	IV	III	I	V
(c)	IV	II	III	V
(d)	III	IV	I	V

AP EAMCET-24.04.2019 Shift-II

Ans. (b) : Isogamy- Fusion of similar gametes.
Anisogamy - Fusion of male and female gamete of different morphology.
Hologamy - Fertilization occurs in lower organism (unicellular) gamete.
Examples

Isogamy	–	Monocystis
Anisogamy	–	Plasmodium
Hologamy	–	Trichonympha
Conjugation	–	Paramecium

449. The process of 'exflagellation' occurs in which one of the following stages of the life cycle of plasmodium ?

(a) Sporogony
(b) Erythrocytic schizogony
(c) Hepatic schizogony
(d) Gametogony

TS EAMCET-08.05.2019 Shift-I

Ans. (d) : In this life cycle of Plasmodium malaria parasite, exflagellation occurs in microgametocytes occur in the stomach of Anopheles mosquito.

- **Sporogony -** Plasmodium sporogony has extracellular phase of asexual replication.
- **Erythrocytic schizogony** parasites undergo asexual multiplication in erythrocytis, merozoites infect red blood cell.

Hepatic schizogony, multinucleate form of parasite which develop in hepatic cells.

450. Which is CORRECT sequence in the developmental stages of plasmodium?

(a) Sporozoites → Merozoites → Trophozoites → Schizonts
(b) Merozoites → Sporozoites → Trophozoites → Schizonts
(c) Trophozoites → Merozoites → Sporozoites → Schizonts
(d) Schizonts → Merozoites → Sporozoites → Trophozites

MHT CET-2019

Ans. (a) : Plasmodium is unicellular protozoa. It causes malaria parasite. The sequence of development stage of Plasmodium -

- Sporozoites → Merozoites → Trophozoites → Schizonts stage.
- P. Sporozoites malaria parasite enter in human body by blood into liver.
- Merozoites infect red blood cell.
- The ring stage trophozoites mature in schizonts.

451. Identify the enzyme secreted by trophozoites of *Entamoeba hystolytica* to dissolve the mucosal lining of the intestine of man.

(a) Hyaluronidase (b) Histolysin
(c) Acrosin (b) Renin

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : Histolysin enzyme is secreted by trophozoites of *Entamoeba histolytica* to dissolve the mucosal lining of the intestine of man. The trophozoites live in the lumen of the large intestine, where it multiply and differentiates in to cyst.

452. Infective stages of malarial parasite is found in –

(a) Salivary glands of mosquito
(b) Intestine of mosquito
(c) Heamolymph of mosquito
(d) Stomach wall of mosquito

AIIMS-27.05.2018 Shift-II

Ans. (a) : Plasmodium belongs to phylum protozoa, which causes malaria disease.
Plasmodium is digenetic parasite (complete their life-cycle in two host), they requires two different hosts a vertebrate intermediate host, such as a human, and an insect definitive host, also known as the **vector** i.e., female **Anopheles mosquito**.
When the mosquito bites humans it ingests blood cells containing gametocytes. The mosquito digests the blood cells, releasing the male and female gametes, which fuse together and burrow into the mosquito's gut wall, where they mature inside oocysts. After 8-15 days the

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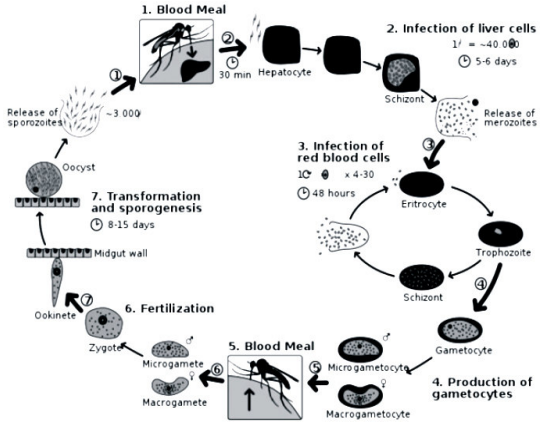
oocysts burst and sporozoites are released into the body cavity of the mosquito. From there, they travel to the salivary glands. When the mosquito bites these infective sporozoites enters the blood of the humans.

Sporozoites are the infective stages of the malaria parasite, found in **salivary glands** of the mosquito.



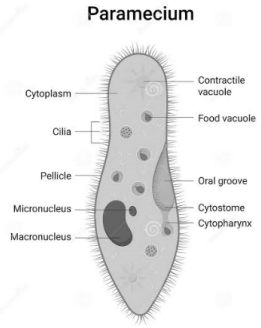
453. ------- is an example of ciliated Protozoa.

(a) Amoeba (b) Plasmodium
(c) Monocystis (d) Paramecium

Tripura JEE-2018

Ans. (d) : Paramecium is a genus of eukaryotic unicellular ciliates.

- The co-ordinated movement of thousands of cilia propels Paramecium. It can rotate around its axis and move in the reverse direction on encountering an obstacle.



454. The following are types of parasites

(I) Intracellular
(II) Coelozoic
(III) Intercellular
(IV) Hyperparasite

Which of the above are correct regarding *Nosema notabilis*?

Options:

(a) I, II (b) I, IV
(c) II, III (d) III, IV

AP EAMCET-25.04.2018 Shift-II

Ans. (b) : *Nosema notabilis* is a hyperparasite of *Spherospora polymorpha*. Intra cellular and hyperparasistism is the character of this organism. A hyperparasite is an organism, which parasitizes on another parasite whereas intracellular parasite as are microparasites that are capable of growing and reproducing inside the cells of a host.

455. Match the following

List–I **Animal**		**List–II** **No. of flagellae**
(A) Giardia		(I) Many
(B) Trypanosoma		(II) 3 pairs
(C) Trichomonas		(III) 4 pairs
(D) Trichonympha		(IV) Four
		(V) Single

Options:

	(A)	**(B)**	**(C)**	**(D)**
(a)	III	IV	V	I
(b)	III	V	II	IV
(c)	III	V	IV	I
(d)	III	II	IV	I

AP EAMCET-25.04.2018 Shift-II

Ans. (c) :

Animal		**No. of flagellae**
Giardia	—	4 Pairs
Trypanosoma	—	Single
Trichomonas	—	Four
Trichonympha	—	Many

456. Match the following :

List-I	**List-II**
(A) Ectoparasite	**(i) Ascaris**
(B) Hyperparasite	**(ii) Entamoeba**
(C) Coelozoic parasite	**(iii) Leishmania**
(D) Histozoic parasite	**(iv) Nosema**
	(v) Head lice

The correct answer is

	A	**B**	**C**	**D**
(a)	(iii)	(iv)	(v)	(i)
(b)	(v)	(iv)	(i)	(ii)
(c)	(ii)	(iv)	(iii)	(i)
(d)	(v)	(iv)	(ii)	(iii)

TS EAMCET-02.05.2018 Shift-II

Ans (b):

	List–I	**List–II**
a.	Ectoparasite	Head lice
b.	Hyperparasite	Nosema
c.	Coelozoic parasite	Ascaris
d.	Histozoic parasite	Entamoeba

457. Most unusual protist phyla is

(a) coflagellates (b) dinoflagellates
(c) choanoflagellates (d) paraflagellates

HP CET-2018

Ans. (b) : Dinoflagellates is most unusual Protist phyla. It is unicellular Protista comprising two flagella.

- These are mostly marine planktons but found in freshwater also.
- They have characteristic of both plants and animals.

458. Ciliates differ from all other protozoans in

(a) using flagella for locomotion
(b) having a contractile vacuole for removing excess water
(c) having two types of nuclei
(d) using pseudopodia for capturing prey

NEET-2018

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Ans. (c) : The ciliates differ from all other protozoans in having two types of nuclei, larger nuclei is called **macronucleus** and smaller nuclei is known as **micronucleus.** This type of nucleus is called a **dimorphic nucleus**.

459. Statement (S): Mechanical vector merely transfers the infective stage of a parasite.
Reason (R): In this vector a part of development of parasite takes place before it gets transferred to another host.
Which of the following is true?
(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-I

Ans. (c) : Mechanical vector are those organisms that transfers the infective stage of a parasite without themselves getting affected. The parasite development doesn't occur in such type of vector. Example: Housefly.

460. Match the following

	List-I		List-II
(p)	**Cytozoic parasite**	**(i)**	**Lives within the cavities of host body.**
(q)	**Coelozoic parasite**	**(ii)**	**Lives between the cells of the tissue and organs of the host.**
(r)	**Histozoic parasite**	**(iii)**	**Lives within the host cells.**
(s)	**Hyper parasite**	**(iv)**	**A parasite lives in/on the body of another parasite.**

The correct answer is

	(p)	(q)	(r)	(s)
(a)	(iv)	(ii)	(i)	(iii)
(b)	(iii)	(i)	(ii)	(iv)
(c)	(i)	(iii)	(ii)	(iv)
(d)	(iii)	(iv)	(ii)	(i)

TS EAMCET-02.05.2018 Shift-I

Ans. (b)
Cytozoic parasite - Live within the host cells. Eg. *P. vivax*
Coelozoic parasite - Lives with in the cavity of host body. Eg. *Ascaris*
Histozoic parasite - Lives between the cell of the tissue and organ of the host. Eg. *Wuchereria bancrofti*.
Hyper parasite - A parasite live in/on the body of another parasite. Eg. *Nosema* .

461. Match the following

List-I Organism	List-II Number of Flagella
(p) Trypanosoma	**(i) Many**
(q) Euglena	**(ii) 2**
(r) Giardia	**(iii) 1**
(s) Trichonympha	**(iv) 8**

The correct answer is

	(p)	(q)	(r)	(s)
(a)	(iii)	(ii)	(iv)	(i)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(ii)	(i)	(iii)	(iv)
(d)	(iv)	(i)	(ii)	(iii)

TS EAMCET-02.05.2018 Shift-I

Ans. (a) :

Organism	-	Number of flagella
Trypanosoma	-	1 flagella
Euglena	-	2 flagella
Giardia	-	8 flagella
Trichonympha	-	Many

462. Assertion (A): Euglenoids have a flexible body.
Reason (R): They have a protein rich layer called pellicle, which makes their body flexible.
Which of the following is true?
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is true
(d) (A) is false but (R) is true

TS EAMCET-02.05.2018 Shift-I

Ans. (a) : Euglena is unicellular organism. Their body is covered by a protein rich layer called pellicle, which make their body flexible. Euglenoids change their shape because they have no rigid cell wall. The pellicle is composed of fibrous elastic protein, the small amount of lipid, carbohydrates and maintains a definite shape. It is flexible enough to permit temporary change in the body shape.

463. Statement (S) : Transverse binary fission seen in Paramecium is also considered as homothetogenic fission
Reason (R) : The plane of fission is at obtuse angle to the longitudinal axis of the body
Which of the following is true?
(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-03.05.2018 Shift-I

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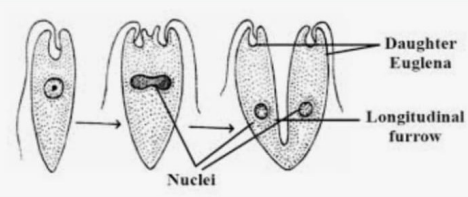
Ans. (c) Transvers binary fission seen in paramecium is also considered homothetogenic fission.

• Longitudinal binary fission, the plane of fission is at obtuse angle to the longitudinal axis of body (eg. Euglenoid)



464. Match the following

	List - I		List – II
(A)	**Longitudinal binary fission**	**(I)**	**Paramecium**
(B)	**Transverse binary fission**	**(II)**	**Amoeba**
(C)	**Sporogony**	**(III)**	**Pleurobrachia**
(D)	**Sporulation**	**(IV)**	**Plasmodium**
		(V)	**Euglena**

The correct answer is

	A	B	C	D
(a)	V	I	IV	II
(b)	V	III	IV	II
(c)	I	II	V	IV
(d)	V	IV	I	II

AP EAMCET-25.04.2018 Shift-I

Ans. (a) :

Longitudinal binary fission	- Euglena
Transverse binary fission	- Paramecium
Sporogony	- Plasmodium
Sporulation	- Amoeba

465. Study the following stages of life history of Plasmodium in mosquito and arrange them in correct sequence

(A) Sporoblast **(B) Oocyst**
(C) Sporozoite **(D) Ookinete**

The correct answer is:

Options:

(a) B-D-A-C (b) C-B-D-A
(c) D-B-A-C (d) A-C-D-B

AP EAMCET-28.04.2017 Shift-II

Ans. (c) : Life cycle of Plasmodium parasite that includes three stages. Gametocytes, sporozoites and merozoites

Gametocyte:- Gametocyte are transmitted through Anopheles mosquito . The male and female gametocyte mate inside the gut of mosquito these parasites are called **sporozoite.**

Sporozoites: - Sporozoites infected mosquito feed on human which is transmitted through the saliva into blood stream.

Merozoites : - The merozoites exist from the liver, enters the blood stream and again attack the red blood cells.

466. Match the following columns.

Column I	Column II
A. Pinocytosis	**1. Euglena gracilis**
B. Holozoic	**2. Paramecium**
C. Parasitic	**3. Amoeba proteus**
D. Mixotrophic	**4. Monocystis**

Codes

	A	B	C	D
(a)	3	2	4	1
(b)	2	3	4	1
(c)	4	3	1	2
(d)	1	4	2	3

JIPMER-2017

Ans. (a) :

Pinocytosis	- Amoeba proteus
Holozoic	- Paramecium
Parasitic	- Monocystis
Mixotrophic	- Euglena gracilis

467. Choose the following characteristics found in Noctiluca:

(A) Bioluminiscence
(B) Prokaryote
(C) Proteinaceous cell wall
(D) Cell wall with cellulose plates
(E) Chromosome without histones
(F) Eukaryote
(G) Longitudinal binary fission

Options :

(a) A, B, D, E, G (b) A, C, E, F
(c) D, E, F, G (d) A, D, E, F

AP EAMCET-28.04.2017 Shift-I

Ans. (d) : *Noctiluca* is a roughly spherical marine dinoflagellate which is strongly phosphorescent.

• *Noctiluca* produce bioluminescence and cell wall with cellulose plate, chromosome without stone, and they are eukaryotes.

468. Amoeba is immortal because:

(a) It is multicellular
(b) It is microscopic
(c) It reproduces by sexual method only
(d) Parental body is distributed among the offsprings during binary fission

Karnataka CET-2017

Ans. (d) : Amoeba is immortal because parental body is distributed among the offspring during binary fission.

• Binary fission is a method of asexual reproduction in which a parent cell divide into two halves and each daughter cell develop into an adult.

469. In erythrocytic cycle of Plasmodium vivax, the following stages are observed.

(I) Rosette stage
(II) Trophozoites
(III) Amoeboid stage
(IV) Signet ring stage
(V) Liberation of erythrocytic merozoites
(VI) Shuffner's dots in RBC
Arrange them in correct sequence

@apna_pdf

Options:

(a) II, IV, VI, III, I, V (b) II, IV, III, VI, I, V
(c) V, I, VI, III, IV, II (d) II, IV, III, VI, V, I

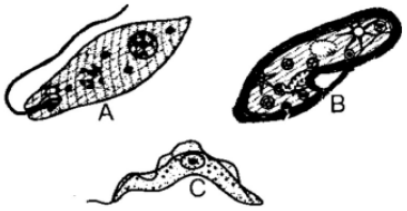
AP EAMCET-28.04.2017 Shift-I

Ans. (b) : *Plasmodium vivax* is parasite of protozoa. It causes malaria by female Anopheles mosquito to human.

The current sequence of following stage–

Trophozoites → Signet ring stage → Amoeboid stage → Shuffner's dots in RBC → Rosette stage → Liberation of erythrocytic merozoites.

470. Refer to the following figures.



Column I	Column II	Column III
A.	1. Paramecium	I. kinetoplast
B.	2. Euglena	II. Trichocysts
C.	3. Trypanosoma	III. Astaxanthin

(a) A-3-II, B-1-III, C-2-I
(b) A-1-II, B-3-I, C-2-I
(c) A-2-III, B-1-II, C-3-I
(d) A-3-I, B-2-II, C-1-III

AIIMS-2017

Ans. (c) :
(a) Euglena – Astaxanthin
(b) Paramecium – Trichocysts
(c) Trypanosoma – Kinetoplast

- **Astaxanthin** is an antioxidant. It is obtained from some algae and yeast etc.

It is used as many purposes Alzheimer's disease, Athletic performance, aging skin.

- **Trichocyst -** Many minute rod like structures found near the surface of ciliates and dinoflagellates used as locomotion, prey capture and defense.
- **Kinetoplast -** A mass of mitochondrial DNA lying close to the nucleus in some flagellate protozoa.

471. Auxospores are produced in

(a) diatoms (b) green algae
(c) brown algae (d) red algae

VMMC-2015

Ans. (a) : Auxospores are formed in diatoms and hormocysts are formed in Cyanobacteria.

- Both Cyanobacteria and diatoms play a part in nutrient cycling. Both organism are major source of oxygen on earth.
- The auxospore is usually a zygote and hence it is almost always diploid. It is not naked but possess a special organic wall.
- Diatoms have cell wall which are silica rich and they reproduce by asexual reproduction through spore formation like auxospores.

472. Life history of Plasmodium is:

(a) digenetic (b) monogenetic
(c) dizygotic (d) none of these

Haryana PMT-1999

Ans. (a) : Life history of Plasmodium is digenetic. Plasmodium belongs to phylum Apicomplexa. It is a single cell parasite which multiplies in the RBC of human and mosquito intestine.

- Mosquitoes, mainly of the genus Anopheles are the invertebrate hosts. Plasmodium vertebrate hosts include reptiles birds, rodents and primates.

473. Protists obtain their food as ?

(a) Photosynthesizers only
(b) chemosynthesizers
(c) heterotrophs only
(d) Both (a) and (c)

AIIMS-2011

Ans. (d) : The mode of nutrition in protists are holozoic, means in presence of sun light food material is synthesizes by photosynthesis. But when the light is absent they get their food material from dead and decaying organism.

- Protists are a vast group of species. They are microscopic and unicellular.
- Protists cell have a nucleus and organelles. Most protists can be found in damp and saturated environments.

474. Protista differs from monera in having

(a) Cell wall
(b) Autotrophic nutrition
(c) Flagella
(d) Nuclear membrane

AIIMS-2010

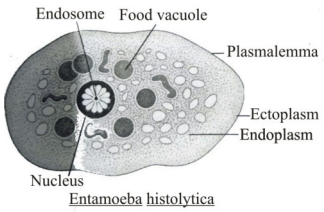
Ans. (d) : The protists are much advanced than bacteria. Monerans do not possess a true nucleus, whereas protista has its own nuclei bound with the nuclear membrane. The organism belonging to protists live in water, moist places, etc.

475. Intermediate host is absent in the infection of ?

(a) Plasmodium (b) Trypanosoma
(c) Entamoeba (d) Filarial worm

AIIMS-2009

Ans. (c) : Intermediate host is absent in the infection of *Entamoeba histolytica* because it lives in the large intestine of humans (single host). It causes amoebiasis or amoebic dysentery. Thus, intermediate host is absent in Entamoeba.



Entamoeba histolytica

476. Sexual stage (gametocytes) of Plasmodium occurs in

(a) Salivary glands of mosquito
(b) Human RBC

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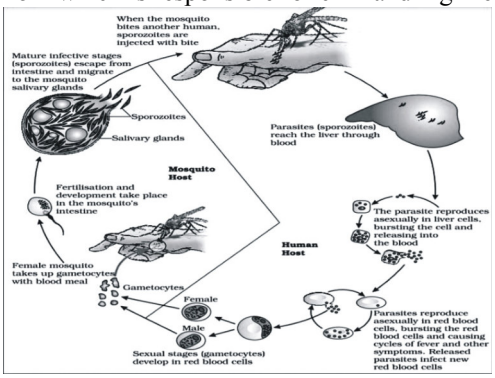
(c) Intestine of mosquito
(d) Human liver

AIIMS-2013

Ans. (b) : The complex life cycle of Plasmodium parasite that includes three stages namely Gametocytes, Sporozoites and Merozoites.

• The male gametocytes called **microgametocytes** and female gametocytes called **macrogametocytes** are transmitted through the Anopheles mosquito. The parasite when enters into the human body, then they firstly multiply in liver cells and then attack the red blood cells resulting in their rupture. The rupture of RBCs is associated with release of toxic substance hemozoin which is responsible for chill and high fever.

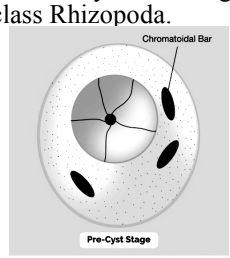


477. In Entamoeba histolytica, the presence of chromatid bodies is characteristic of
(a) Precystic stage
(b) Mature quadrinucleate stage
(c) Trophozoite stages
(d) Mature binucleate stage.

AIIMS-2002

Ans. (a) : In Entamoeba histolytica, the presence of chromatid bodies is the characteristic of precystic stage. It is an oval, non-motile form without a cyst wall. It contains reserve food glycogen and chromatid bodies.

• The Entamoeba histolytica belongs to the phylum protozoa in the class Rhizopoda.



478. The part of life cycle of malarial parasite Plasmodium vivax, that is passed in female Anopheles is
(a) Sexual cycle
(b) Pre-erythrocytic schizogony
(c) Exoerythrocytic schizogony
(d) Post-erythrocytic schizogony

AIPMT-1992

Ans. (a) : The sexual stage in the life cycle of Plasmodium occurs in the abdomen of the mosquito. The sexual phase includes gametocytes, mega-gametophyte "female" and micro-gametocytes "male" that reach the abdomen of the female anopheles mosquito by sucking human blood.

479. Malignant tertian malaria parasite, belongs to does
(a) Plasmodium falciparum (b) P. vivax
(c) P. ovale (d) P. malariae

AIPMT-1991

Ans. (a) : Malignant tertian malaria is caused by *Plasmodium falciparum*. It is also known as pernicious malaria. The cycle of fever is of 48 hours. It affects the brain.

480. Kala azar and Oriental Sore are spread by
(a) housefly (b) bed bug
(c) sand fly (d) fruit fly

AIPMT-1990

Ans. (c) : Kala-azar and oriental sore are spread by sandfly. These parasites are transmitted to humans by the bite of an infected female Phlebotomine sandfly.

• Sandfly fever viruses are transmitted by sandflies of the Phelbotomus genus in the human-vector, human cycle especially during the warm season.

481. During unfavourable conditions Amoeba reproduces through :
(a) binary fission (b) sporulation
(c) multiple fission (d) conjugation

Punjab MET-2006
Rajasthan PMT-2004

Ans. (c) : During unfavourable condition amoeba reproduces through multiple fission.

• The type of asexual reproduction where may daughter cells are produced from a single parent cell is called as multiple fission.

482. When more than one species of Plasmodium infect a person, it is called:
(a) Quartan malaria
(b) Tertian malaria
(c) Aestivo- autumnal malaria
(d) Quotidian malaria

JCECE-2002

Ans. (d) : When more than one species of Plasmodium infect a person, it is called **quotidian malaria**.
Plasmodium are protozoa parasite, it causes malaria.
Four species causes disease in human -
Plasmodium falciparum – malignant tertian
P. vivax – tertian malaria
P. ovale – mild tertian
P. malariae – quartan malaria

483. In which species of Paramecium, autogamy is found?
(a) Paramecium caudatum
(b) Paramecium aurelia
(c) Paramecium bursaria
(d) All of the above

JCECE-2002

Ans. (b) : Paramecium is single celled protozoa which produce single parent cell called autogamy

- P. aurelia species autogamy is found P. aurelia has one macronucleus and two micronucleus.
- P. caudatum is unicellular cilliated protozoa. It reproduces by binary fission

eg. P. caudatum and P. bursaria - Binary fission

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484. Which response Amoeba shows towards current of water?
(a) Galvanotaxis (b) Rheotaxis
(c) Geotaxis (d) Thigmotaxis
JCECE-2002

Ans. (b) : Rheotaxis is the movement of an organism response to current of water or air.
• Amoeba show rheotaxis by drifting towards the line of water. Amoeba exhibits positive rheotaxis.

485. NH_3 in Amoeba is excreted by:
(a) food vacuole (b) contractile vacuole
(c) plasma membrane (d) all of the above
JCECE-2006

Ans. (c) : In amoeba waste material NH_3 is excreted through diffusion or plasma membrane from the general body surface.
- Amoeba has no excretory organ.
- Food vacuole is a membrane enclose sac which has digestive function.
- Contractile vacuole is process of osmoregulation.

486. Which of the following is monogenetic parasite?
(a) Entamoeba histolytica
(b) Taenia solium
(c) Wuchereria bancrofti
(d) Plasmodium vivax
JCECE-2006

Ans. (a) : The *Entamoeba histolytica* is monogametic with humans as the only host. These monogametic parasites complete their life cycle in a single host. All other options are of digenetic parasites, as they complete their life cycle in two hosts.

487. Protozoans lack which of the following as locomotoryorgan?
(a) Cilia (b) Flagella
(c) Pseudopodia (d) Parapodia
AFMC-2003

Ans. (d) : Parapodia helps in locomotion, gas-exchange, protection, attachment, controlling water flow within a tube or can be reduced altogether. It is found in the class Polychaeta of phylum Annelida.

488. The cyst wall of Euglena is made up of
(a) carbohydrates (b) lipoproteins
(c) lipids (d) histones
Uttarakhand PMT-2010

Ans. (a) : The cyst wall of Euglena is made up of carbohydrates. Euglena cyst wall formed in tide over of unfavourable conditions.
- Euglena is green in colour, due to presence of chlorophyll pigment. Euglena are also heterotrophs.
- Lipid and fatty acid composition of *Euglena gracilis* after growth and various conduction of autotrophy and photoheterotrophy.

489. Schuffner's dots produced by Plasmodium are
(a) reserve food (b) antibodies
(c) hormones (d) antigens
Uttarakhand PMT-2010

Ans. (d) : Schuffner's dots are pigmented spots that appear in blood of malaria infected person.
- They are small red-coloured dots appearing in erythrocytes.
- Antibodies high risk of malaria in P-falciparum

Schuffner's dots – P-ovale, P-vivax
Maurer's dots – P-falciparum
Ziemann dots – P-malaria

490. Plasmodium falciparum causes which type of malaria?
(a) Pernicious Quartan (b) Pernicious
(c) Pernicious Tertian (d) Benign tertian
Uttarakhand PMT-2010

Ans. (b) : Plasmodium falciparum causes Maliganant tertian malaria, Cerebral malaria and Pernicious malaria.
P - malaria - Quartan malaria
P - vivax - Benign tertian malaria
P - ovale - Mild tertian malaria
P- falciparum - Malignant/Cerebral/Pernicious malaria.

491. Which is false for nutrition in Amoeba ?
(a) Omnivorous
(b) Pseudopodia feeder
(c) Holozoic nutrition
(d) Photoautotroph
Punjab MET-2008

Ans. (d) : Nutrition of amoeba occurs through process called **phagocytosis.**
- Holozoic nutrition– The engulf of food in plants on eating.
- Amoeba is an omnivorous because it feeds Algae, bacteria and protozoa.
- It has false feet known as pseudopodia.
- In Amoeba holozoic mode of nutrition and not photoautotrophs.

492. Two mating types of a variety of Paramecium are
(a) Morphologically different and physiologically similar
(b) Morphologically similar and physiologically different
(c) Physiologically similar
(d) Physiologically different
CMC Vellore-2012

Ans. (b) : Mating type of paramecium is morphologically similar and physiologically different.
Example– *Paramecium aurelia.*

493. A student observed a water drop under microscope. He found a photosynthetic organism. Its cell walls form two thin overlapping shells, which fit together as in a soap box.
Which of the following organism it is
(a) Euglenoid (b) Dinoflagellate
(c) Sporozoans (d) Diatom
AP EAMCET-2016

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Ans. (d) : Diatoms are group of microscopic Protist.
- These are unicellular Protista it is composed of silica.
- The vesicle is arranged from plate-like structure called **frustules** which overlap to each other.
- The diatoms structure like soap case.

494. Chlamydomonas and Chlorella, earlier placed in algae within plants (both having cell wall) are now placed together in which new kingdom. Choose the correct option.
(a) Fungi (b) Animalia
(c) Protista (d) Monera

BCECE-2015

Ans. (c) Chlamydomonas and Chlorella have been included in kingdom Protista. Earlier, they were placed in the kingdom algae. But, according to R.H. Whittaker's classification, the classification depends not only on morphology or physiology but also on phylogeny.

495. Which of the following is not matched correctly ?
(a) Anabaena — Cyanobacteria
(b) Amoeba — Protozoa
(c) Gonyaulax — Dinoflagellates
(d) Thermoacidophiles — Archaebacteria
(e) Albugo — Chrysophytes

Kerala PMT-2011

Ans. (e) : Albugo candida commonly known as white rust. It belongs to Oomycetes.
(a) Anabaena - Cyanobacteria
(b) Amoeba - Protozoa
(c) Gonyaulax - Dinoflagellates
(d) Thermoacidophiles - Archeobacteria
(e) Albugo - Oomycetes

496. Which one of the following is a characteristic feature of Chrysophytes ?
(a) They are parasitic forms which cause disease in animals
(b) They have a protein rich layer called pellicle
(c) They have indestructible wall layer deposited with sillica
(d) They are commonly called Dinoflagellates
(e) They are saprophytic Protista

Kerala PMT-2011

Ans. (c) : Chrysophytes are algae, it is found in wide range of lake.
- Chrysophytes of the coloring of specific photosynthetic pigment. It is commonly called golden brown algae.
- A siliceous scale or plate is connected to the wall of some species.
- They have indestructible wall layer deposit with silica

497. Which of the following does not belong to the kingdom Protista ?
(a) Chrysophytes (b) Euglenoids
(c) Ascomycetes (d) Dinoflagellates
(e) Protozoans

Kerala PMT-2011

Ans. (c) : Ascomycetes doesn't belong to Protista.
- Ascospore are formed inside the cup shaped cell (ascus) called **ascomycetes.**

Example - Yeast, Penicillium, Aspergillus

498. Which one is a holophytic protozoa?
(a) Euglena (b) Amoeba
(c) Monocystis (d) Giardia

BCECE-2015

Ans. (a) : Euglena, a single-celled eukaryote, contain holophytic nutrition, as they have chloroplasts, which are used for photosynthesis. Autotrophic is another name for holophytic. These are organisms that can use inorganic elements to create food, such as green plants.

499. Mode of nutrition in Trypanosoma is:
(a) saprozoic (b) parasitic
(c) autotropic (d) phototropic

DUMET-2006

Ans. (b) : Parasitic mode of nutrition occurs in *Trypanosoma*
- *Trypanosoma* feed by absorbing nutrients, through their outer membrane, from the body fluids of the host.

500. Chagas disease is caused by:
(a) Trypanosoma gambiense
(b) Plasmodium sp.
(c) Trypanosoma cruzi
(d) Treponema pallidum

DUMET-2006

Ans. (c) : Chagas disease is caused by *Trypanosoma cruzi*. It causes infection is curable, if treatment is initiated soon after infection. In chronic patients, antiparasitic treatment can potentially prevent or curb disease progression and prevent transmission, for instance mother to child infection.

501. Marine protozoans lack contractile vacuole because
(a) osmoregulation is done by cell membrane
(b) they are hypo-osmotic to their environment
(c) they are isotonic with their environment
(d) their small body cannot accommodate it

DUMET-2002

Ans. (b) : The marine protozoan live in hypertonic environment. They loss water due to exosmosis. It prevents water loss and conserve water in the body.
- The marine protozoa lack contractile vacuole.
- They are hypo-osmotic to their environment contractile vacuole help to remove excess water and perform osmoregulation.

502. Amoeba is a/an:
(a) unicellular animal (b) octacellular animal
(c) multicellular animal (d) all of the above

DUMET-2005
UPCPMT-2003

Ans. (a) : Amoeba is a unicellular animal protozoa, it is single cell organism.
- Pseudopodia help in osmoregulation.

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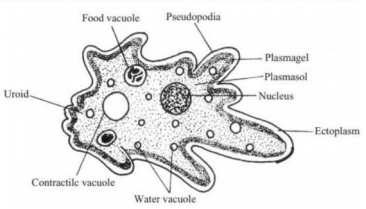
- No stomach present in amoeba storage of food and digestion take place inside the food vacuole in the cytoplasm of amoeba.



Structure of Amoeba

503. Sporogony of malarial parasite occur in:
(a) liver of man
(b) stomach wall of mosquito
(c) RBCs of man
(d) salivary glands of mosquito

DUMET-2004
BVP-2014, 2000

Ans. (b) : Sporogony of malarial parasite occurs in stomach wall of female Anopheles mosquito.
- Some merozoites form gametocytes which are sucked by mosquito along with blood followed by gamete formation inside the stomach of female Anopheles.

504. Which of the following results from conjugation in Paramecium?
(a) Cell death (b) Cell division
(c) Budding (d) Recombination

KVPY SB & SX-2014

Ans. (d) : In paramecium, conjugation is a form of sexual reproduction, which is a temporary union of two individuals of the same species for the mutual exchange of genetic materials. The ventral surfaces attach and the exchange of genetic material starts by the formation of the cytoplasmic bridge. Here, the male pronucleus fuses with the female pronucleus to form a diploid zygote which forms a mature organism. This results in recombination.

505. Name the protozoan parasite with a food vacuole.
(a) Leptomonas (b) Plasmodium
(c) Trypanosoma (d) Leishmania

AP EAMCET-1998

Ans. (b) : The protozoan parasite with a food vacuole is Plasmodium. Here food vacuole is a lysosome-like organelle, where erythrocyte hemoglobin digestion occurs.

506. Unicellular algae, diatoms and protozoans are the members of
(a) Monera (b) Fungi
(c) Protista (d) Plantae

J&K CET-2013

Ans. (c) : Protista is unicellular eukaryotic organism which include algae, diatoms and protozoans.

507. Schizogony of Plasmodium is also called as
(a) sporogony (b) gamogony
(c) agamogony (d) binary fission

Punjab MET-2011

Ans. (c) : Schizogony of Plasmodium is also called as **agamogony** because it is also the process of formation of new individual by cell division.
Agamogony is an asexual process and the product of schizogony generally grows into trophozoites.

508. In life cycle of Plasmodium, ex-flagellation leads to:
(a) formation of microgametes
(b) formation of flagella in sperm
(c) destruction of flagella from sperm
(d) formation of sporozoites

Rajasthan PMT-2002

Ans. (a) : Life cycle of Plasmodium ex-flagellation leads to formation of microgametes. Microgamete formation occurs inside the stomach of mosquito.
- It develops into 4 to 8 microgametes by the process of ex-flagellation. The macrogamete and microgamete fuse and form the zygote and then develops ookinetes, then oocyst further divides and form sporozoites.

509. What happens in anterior part of Amoeba at the time of formation of pseudopodia?
(a) plasma gel convert into plasma sol
(b) plasma sol convert into plasma gel
(c) ectoplasm convert into endoplasm
(d) endoplasm convert into ectoplasm

Rajasthan PMT-2002

Ans. (a) At the time of formation of pseudopodia, the plasma-gel converts into plasmasol, where it begins to flow. It is the beginning of pseudopodium formation. The constant flow of plasmasol results in the growth of the pseudopodium.

$$\text{Plasmasol} \underset{\text{Solation}}{\overset{\text{Gelation}}{\rightleftharpoons}} \text{Plasmagel}$$

510. Where does exoerythrocytic cycle take place in life cycle of Plasmodium?
(a) RBC of human
(b) Human liver
(c) Stomach of Anopheles mosquito
(d) Salivary gland of Anopheles mosquito

Rajasthan PMT-2002

Ans. (b) : The exoerythrocytic cycle take place in plasmodium in human liver.
- The sporozoites pickup by liver cell and change of merozoite in RBC.
- Stomach of Anopheles mosquito occurs in the gametocytes.
- Salivary gland of female Anopheles mosquito occurs in two salivary gland, two lateral lobe and one median lobe.

511. Which of the following class of Protozoa is totally class parasites ?
(a) Mastigophora (b) Ciliata
(c) Sporozoa (d) Rhizopoda

Rajasthan PMT-1999

Ans. (c) : Sporozoa have spore like cells and parasite. They do not contain locomotary organs.
- Sporozoa are parasitic and cause disease.
- They are pathogenic species which plasmodium sporozoa infect the host cell.

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512. Dimorphism is present in which Protozoa ?
(a) Iobosa (b) Ciliata
(c) Sporozoans (d) Radiolarian
Rajasthan PMT-1999

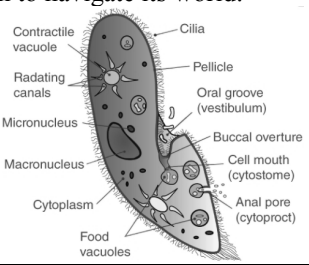
Ans. (b) : The presence of two different type of nuclei in the cell is called as dimorphism. It is a common characteristic of ciliated Protists such as Paramecium.

513. In Amoeba hyaline cap is formed by :
(a) around the food vacuole
(b) around the contractile vacuole
(c) around the nucleus
(d) on pseudopodia
Rajasthan PMT-1999
MGIMS Wardha-2012

Ans. (d) : In amoeba hyaline cap is formed by pseudopodia.
- Pseudopodia is called false feet, they are extension of cytoplasm thick liquid inside amoeba.
- Pseudopodia helps in the movement and capture of prey or in obtaining nutrition.
- The food particles are trapped by surrounding pseudopodia and they engulf it inside cell forming.

514. Slipper animalcule is :
(a) Paramecium (b) Trypanosoma
(c) Entamoeba (d) Protozoa
Manipal-2005

Ans. (a) : Paramecium is called **"slipper animalcules"** because of their slipper-like shape.
- This slipper-shaped ciliate is commonly found in fresh water ponds around the world.
- Paramecium is a genus of unicellular ciliated protozoa.
- They provide the "touch" sense that allows the Paramecium to navigate its world.



515. Sporozoite infectious stage of Plasmodium parasite contains
(a) two nucleus and a vacuole
(b) one nucleus and several vacuole
(c) vacuole and other cell organelles
(d) a nucleus
BVP-2014

Ans. (d) : The Plasmodium sporozoite constitutes the first form of the malaria parasite which enters the human body and provides the first and leading targets to control an infection.

516. Who discovered oocysts in the stomach of female Anapheles?
(a) Ronald Ross (b) Charles Lavern
(c) Golgi (d) Lamble
VMMC-2009

Ans. (a) : Ronald Ross first time discovered Oocytes of Plasmodium in the stomach of female Anopheles.
- Anopheles mosquito helps in the transmission of malaria parasite in human.
- In 1902, he was awarded the Nobel prize for medicine for his work an malaria, by which he had shown how it enters the organism.

517. Kinety system is present in
(a) Flagellates (b) Sarcodines
(c) Ciliates (d) Sporozoans
AP EAMCET-2015
TS EAMCET-2015

Ans. (c) : Kinety system present in the ciliates.
- A kinety frame-work is available in hair-like organelles that are similar in eukaryotes flagella.
- It is unit of structure in the Protozoa comprising the kinetosomes, the basal granules of the cilia and flagella and the kinetodesma, a fine strand running from the kinetosomes.

518. In the life cycle of Plasmodium vivax, Schizogony occurs in these cells of man
(A) Hepatocytes (B) Adipocytes
(C) Erythrocytes (D) Reticulocytes
(a) (A) and (C) (b) (A) and (B)
(c) (B) and (D) (d) (C) and (D)
TS EAMCET-15.05.2016

Ans. (a) : Protozoan parasite, Plasmodium vivax is a human pathogen which causes malaria. The sporozoites enters the human bloodstream and enters the liver cells (hepatocytes) where it undergoes exo-erythrocytic schizogony and produces merozoites. Then, merozoites are released into the bloodstream where they enter RBC (erythrocytes) and undergo erythrocytic schizogony.

519. Choose the correct statements with reference to the flagellum in Protozoa
(A) Nexins are linkers that interconnect peripheral doublets
(B) The 'B' tubule of each peripheral doublet bears dynein arms
(C) Axoneme is the central microtubular structure of flagellum
(D) There are two central and nine peripheral triplets in the basal granule
(a) (A) and (C) (b) (B) and (D)
(c) (A) and (D) (d) (B) and (C)
TS EAMCET-15.05.2016

Ans. (a) : Flagellum in protozoa with one or a small number of long whip-like hair called **flagella** that are used for locomotion.

520. Excretory substance of amoeba is:
(a) Ammonia (b) Urea
(c) Uric acid (d) Guanine
Rajasthan PMT-1995

Ans. (a) : The excretory substance of amoeba is ammonia and carbon dioxide. It is formed as end product of the processes of digestion and respiration.
- These waste materials are excreted out by the process of diffusion through the general body surface. They have no excretory organs are present so contractile vacuoles function as an excretory unit.

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521. Which of the following only one host is present in life cycle?
(a) Entamoeba histolytica
(b) Plasmodium
(c) Taenia
(d) Liver fluke

Rajasthan PMT-1995

Ans. (a) : *Entamoeba histolytica* is a monogenetic parasite, only one host is present in the life cycle. It is responsible for a disease known as **Amoebiasis.** It usually occurs in the large intestine of humans. Its life cycle is monogenetic because it does not require any intermediate host.

522. Which of the following doesn't spread disease in human?
(a) Entamoeba histolytica
(b) Entamoeba gingivalis
(c) Entamoeba coli
(d) Plasmodium ovale

Rajasthan PMT-1995

Ans. (c) : *Entamoeba coli* does not spread disease in human.
• *Entamoeba coli* is common protozoa. It is non-pathogenic protozoa. It is transmitted though fecal-oral contact, and the mature cyst can be found in contaminated water. *Entamoeba histolytica* causes Amoebiasis and dysentery disease.
Entamoeba gingivalis **-** Pyorrhoea
Plasmodium ovale **-** Tertian malaria

523. Pseudopodia is characteristic of following class:
(a) Ciliata (b) Sporozoa
(c) Sarcodina (d) Mastigophora

Rajasthan PMT-1995

Ans. (c) : Pseudopodia is a characteristic of Class Sarcodina of phylum Protozoa.
• Pseudopodia help in locomotion and food capture.
• Class Sporozoa are non-motile.
• Class Mastigophora have flagella and Class Cilliata have cilia, help in locomotion.

524. Mode of feeding in free living protozoan is
(a) holozoic (b) saprozoic
(c) both [a] and [b] (d) none of these

DUMET-2007

Ans. (c) : The mode of feeding in free living protozoa is both holozoic and saprozoic. The intake of the complex substance, then breaking them down in simpler forms and gradually absorbing nutrition from it, is called **holozoic nutrition** whereas, the intake of simpler substances and absorbing nutrition from it, is called as **saprozoic nutrition.**

525. Which is correct?
(a) Slime moulds are haploid
(b) Protozoan lack cell wall
(c) Dinoflagellates are immotile
(d) Pellicle is absent in Euglena

DUMET-2007

Ans. (b) : The Protozonas lack cell wall. They are unicellular organisms found in freshwater and marine water. The slime moulds are diploid whereas dinoflagellates are motile. Pellicle is present in *Euglena.*

526. Pseudopodia are produced by
(a) Plasma cell (b) Mast cell
(c) Adipose cell (d) Fibroblast cell

WB JEE-2014

Ans. (d) : The pseudopodia are produced by fibroblast. They are the cells of the connective tissue. They produce the fibres like collagen and the extracellular matrix.

527. During conjugation in Paramecium
(a) Out of the four micronuclei formed, three nuclei degenerate
(b) Out of six macronuclei formed, four nuclei degenerate
(c) Zygote nucleus undergoes eight successive division in each conjugates
(d) Out of 16 nuclei, only four degenerate

BCECE-2012
Punjab MET-2004

Ans. (a) : In Paramecium, during conjugation, the micronucleus undergoes two successive divisions one of which is meiosis. The four haploid daughter nuclei are formed out of them three degenerate and one divides from them, to form two gametic nuclei, one male and one female.

528. Chromatoid bodies in Entamoeba histolytica are found in
(a) Cysts (b) Minuta
(c) Metacysts (d) Trophozoite

CMC Vellore-2011

Ans. (a) : The chromatoid bodies of Entamoeba histolytica are found in cysts i.e. the cyst enters the body of the host organism, they form trophozoites in the small intestine and then enters the large intestine and invade the cell, causing the disease Amoebiasis.
• The cysts of this parasite contains the active form with trophozoites.
• Cysts are present outside the body of the host, in soil, water, and food

529. *Entamoeba histolytica* is:
(a) found in intestine (b) found in liver
(c) found in coelom (d) all of these

Haryana PMT-2000

Ans. (a) : *Entamoeba histolytica* is anaerobic parasite that is found in the colon of intestine and cause disease called Amoebiasis or Dysentery.

530. Kingdom Protista includes :
(a) life cycle showing sporic meiosis
(b) life cycle showing zygotic meiosis
(c) life cycle showing gametic meiosis
(d) both b and c

Punjab MET-2005

Ans. (d) : Kingdom Protista includes the life cycle showing zygotic meiosis and gametic meiosis
• Protista is unicellular in nature.

531. Euglenoid species that have chlorophyll are :
(a) facultative autotrophs
(b) facultative heterotrophs
(c) obligate heterotrophs
(d) obligate autotrophs

Punjab MET-2005

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Ans. (a) : Euglenoid species that have chlorophyll are facultative autotrophs.

- Facultative autotrophs are basically heterotrophs, which also have chlorophyll and make food through photosynthesis.

532. Which creatures are direct or indirect food of all creature on the oceans surface ?

(a) Protozoans (b) Phytoplankton
(c) Fish (d) Aquatic insects

Punjab MET-2005

Ans. (b) : Phytoplankton creature are direct or indirect food of all creature of ocean surface.

- They are the basis of marine food webs and serve as prey for zooplankton, fish larvae and other heterotrophic organisms.

533. Name one disease of mulberry silkworm caused by protozoa

(a) Pebrine (b) Grasserie
(c) Flacheria (d) Muscardine

WB JEE-2008

Ans. (a) : Pebrine, or 'pepper disease' is a disease of mulberry silk worm which is caused by Protozoa.

534. Which of the following groups of organisms have a protein rich layer called pellicle?

(a) Chrysophytes (b) Euglenoids
(c) Dinoflagellates (d) Slime moulds
(e) Protozoans

Kerala PMT-2014

Ans. (b) : The Euglenoids are unicellular, flagellate protists. The body is covered by thin and flexible pellicle which is a protein-rich layer. It is composed of fibrous elastic protein, small amount of lipid and carbohydrates and also maintains a definite shape.

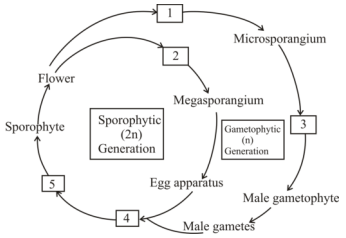
535. What is the main function of filiform apparatus present at the micropylar part of the ovule ?

(a) It prevents the entry of more than one pollen tube into the embryo sac.
(b) It brings about opening of the pollen tube.
(c) It helps in the entry of pollen tube into an antipodal cell.
(d) It helps the pollen tube to enter the ovule through chalazal end.
(e) It guides the entry of pollen tube into a synergid and discharge the male gametes.

Kerala PMT-2013

Ans. (e) : The synergid cell wall forming an extremely thick structure at the micropylar end is called the **filiform apparatus.** It guide the entry of pollen tube into a synergid and discharge the male gamete. The function of filiform apparatus is to guide entry of pollen tube and release of sperm cells.

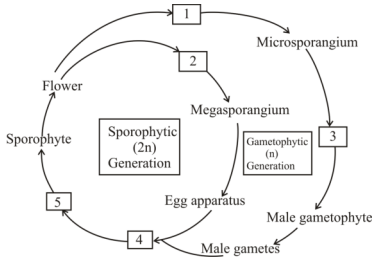
536. The diagram represents the life cycle pattern of an angiosperm. Choose the correct combination of labelling numbered as 1 to 5.



(a) 1. Anther 2. Ovary 3. Microspore 4. Zygote 5. Embryo
(b) 1. Embryo 2. Zygote 3. Anther 4. Ovary 5. Microspore
(c) 1. Ovary 2. Anther 3. Microspore 4. Zygote 5. Embryo
(d) 1. Anther 2. Ovary 3. Zygote 4. Embryo 5. Microspore
(e) 1. Zygote 2. Embryo 3. Anther 4. Ovary 5. Microspore

Kerala PMT-2013

Ans. (a) :



Life cycle Angiosperm:- 1- Anther, 2- Ovary, 3- Microspore, 4- Zygote, 5- Embryo

537. All stages of Plasmodium get digested in stomach of female Anopheles except:

(a) sporozoite (b) gametocyte
(c) erythrocyte (d) none of these

Rajasthan PMT-2005
UPCPMT-2002

Ans. (b) : When the female Anopheles mosquito sucks the infected blood then various phases of malaria parasite reach in their stomach, here digestive enzymes digest all phases besides gametocyte.

538. Chrysophytes, Euglenoids, Dinoflagellates and slime moulds are included in the kingdom

(a) Animalia (b) Monera
(c) Protista (d) Fungi

NEET-2016 Phase-I

Ans. (c) : Chrysophytes, Euglenoids, dinoflagellates and slime moulds are included in the Kingdom Protista. This kingdom includes all single celled eukaryotes.
R.H. Whittaker proposed a five kingdom classification in 1969, in which Protista is a kingdom which comprises organism which are unicellular but eukaryotic organism. These members may be autotrophic or heterotrophic. Primarily these are aquatic.

539. Single-celled eukaryotes are included in:

(a) Protista (b) Fungi
(c) Archaea (d) Monera

AIPMT (Screening)-2010

Ans. (a) : Single-celled eukaryotes are included in Kingdom Protista. It includes all unicellular eukaryotic organisms like flagellates, diatoms, dinoflagellate, slime mould, sarcodina, etc.

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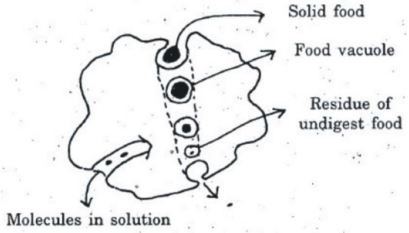
540. In the diagram, which of the following processes are shown in Amoeba?



(a) Phagocytosis (b) Pinocytosis
(c) Execytosis (d) All of these

Karnataka CET-2007

Ans. (d) : Phagocytosis is the process by which amoeba engulf solid food. **Pinocytosis** is the process by which amoeba engulf liquid food. Egestion of the undigest residue from the suface of the body is called **exocytosis.**

541. Yeast belongs to which class?

(a) Basidiomycetes (b) Ascomycetes
(c) Eumycetes (d) None of these

JIPMER-2004

Ans. (b) : The yeast (Saccharomyces) is a saprophytic fungus which belongs to class Ascomycetes.

542. Note the following

(1) During gametogenesis reduction division occurs and gametes formed are haploid according to Bano
(2) Erythrocytic cycle begins with the entry of either cryptozoites or micrometacryptozoites
(3) Maturation of gametocytes generally takes place in spleen and bone marrow
(4) The prepatent period is about 8 days
Which of the above statements are true for Plasmodium vivax?

(a) (1), (2) AND (3) (b) (2), (3) and (4)
(c) (1), (3) and (4) (d) (1), (2) and (4)

AP EAMCET-2007

Ans. (b) : Gametogony or gametogenesis is the development of gametes from gametocyte. In most Protozoa and other animals, reduction division occurs during the formation of gametes. Thus, only gametes are haploid while zygote and other stages are diploid. But in Plasmodium, (Bano 1959), meiosis or reduction division occurs in the first division of zygote. Consequently, only zygote is diploid, while gametes and other stages are haploid.

543. Assertion (A) : Conjugation is a temporary union between two ciliates belonging to two different mating types for the exchange and reconstitution of nuclear materials.
Reason (R) : Conjugation occurs between two inactive individuals which have gained their vigour and vitality due to chromosomal imbalance in their macronuclei, caused by repeated amitotic division
The correct answer is

(a) Both (A) and (R) are true and (R) explains (A)
(b) Both (A) and (R) are true but (R) cannot explain (A)
(c) Only (A) is correct but not (R)
(d) Both (A) and (R) are wrong

AP EAMCET-2007

Ans. (c) : Conjugation is a sexual method of reproduction. It involves fussion of similar gamete which is not free from the parent and form ciliates, where it exchange micronuclear material and separates. It's macronucleus losses its potential ability of metabolic activities.

544. Certain stages of *Plasmodium vivax* may survive for a long period in the liver of man as dormant stages and on reactivation enter into one of the following cycles

(a) erythrocytic schizogony
(b) exoerythrocytic schizogony
(c) cycle of Ross
(d) gametogony

AP EAMCET-2008

Ans. (a) : Plasmodium infected Anopheles mosquito bite human and transmits sporozoids migrates through the blood to the liver where they invade hepatocytes and divide to form multinucleate schizonts (pre-erythrocytic stage).

545. Which structure is formed at the time of exchange of gamete nuclei in given animal during sexual reproduction

(a) Cytoplasmic filaments (b) Plasmodesmata
(c) Internal tubule (d) Cytoplasmic bridge

GUJCET-2015

Ans. (d) : The Paramecium reproduces sexually by lateral conjugation, here the cytoplasmic bridge is formed between male and female individuals.

546. *Nosema bombycis* which causes pebrine in silk worms is a

(a) Virus (b) Bacterium
(c) Protozoan (d) Fungus

Karnataka CET-2009

Ans. (c) : *Nosema bombycis* is a protozoan that causes pebrine disease in silk worms and causes great economic loss. In this infections small brown spot cover the body of silkworm.
• Louis Pasteur identified the spores of *Nosema* as the disease agent in 1865 and suggested control by destruction of infected silkworm colonies and improved sanitation.

547. Which one of the following is unicellular, non motile desmid ?

(a) Clostridium (b) Chlorobium
(c) Cosmarium (d) Chromatium

Karnataka CET-2010

Ans. (c) : Cosmarium is a unicellular non motile desmids. It is a genus of fresh water organism belonging to the member of division Chlorophyta.

548. When fresh water protozoan is placed in marine water.

(a) The number of contractile vacuoles increase
(b) The contractile vacuoles become bigger in size
(c) The contractile vacuoles remain unchanged.

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(d) the contractile vacuoles disappear.

Karnataka CET-2010

Ans. (d): The contractile vacuoles disappears, when a freshwater protozoan is placed in marine water. There function is to remove the excess water outside by the process of osmoregulation. In marine water, it is necessary to retain the water inside the body instead of expelling it out. If the contractile vacuoles, will not disappear, the cell will get dehydrated.

549. Slime-mould belongs to

(a) Kingdom Protista (b) Kingdom Monera
(c) Kingdom Fungi (d) Kingdom Plantae

JIPMER-2016

Ans. (a) : Slime moulds are the saprophytic unicellular eukaryotes. As they are unicellular eukaryotes, they belong to the kingdom Protista.

- Slime mould have both fungal and animal characteristics.
- Some Protista use appendages, hair-like cilia (paramecium), pseudopodia (Amoeba) or whip-like flagella (Euglena) for locomotion.

550. Number of layers in amoeboid cyst are

(a) 2 (b) 3
(c) 1 (d) 4

UP CPMT-2011

Ans. (b): Multiple fission or sporulation in Amoeba takes place during unfavorable condition after enhancement. There are three layer of cyst present.

551. Some of the events occur during life cycle of Plasmodium are given below. Identify the correct statement.

(a) The sporozoites reproduce sexually in liver cells.
(b) The gametocytes develop in RBC.
(c) Female mosquito take up sporozoites with blood meal.
(d) When mosquito bites a man, gametocytes are injected.

Karnataka CET-2016

Ans. (b) : The parasites (Plasmodium) have evolved to infect a wide range of vertebrate hosts including reptiles, birds and a variety of mammals from rodents to primates.

- The most commonly used animal models in malaria research are mice, birds, and non-human primates with each selected for a variety of reason including availability case of handing, and evolutionary relationship to human.
- The gametocytes of *Plasmodium falciparum* responsible for the transmission of this malaria parasite from human to mosquitoes accumulate and mature preferentially in the bone marrow.

552. Who discovered Amoeba?

(a) Russel von Rosenhoff
(b) Hyman
(c) Lamble and Losch
(d) Goldacre and Lorch

UP CPMT-2006

Ans. (a) : Amoeba was discovered by Russel von Rosenhoff in 1755, it is found in fresh water.

- Amoeba is unicellular and fresh water organism. It belongs to the kingdom of Protista.

553. Match the following lists.

List I	List II
(A) Reticulopodia	**(1) Lecithium**
(B) Lobopodia	**(2) Collozoum**
(C) Filopodia	**(3) Globigerina**
(D) Axopodia	**(4) Ceratium**
	(5) Entamoeba

The correct match is :

	A	B	C	D
(a)	3	4	2	1
(b)	3	5	1	2
(c)	4	5	1	3
(d)	2	3	1	4

AP EAMCET-2010

Ans. (b) :

List I	List II
(a) Reticulopodia	(3) Globigerina
(b) Lobopodia	(5) Entamoeba
(c) Filo podia	(1) Lecithium
(d) Axopodia	(2) Collozoum

554. Which one of the following sets of items in the option 1-4 are correctly categorised with one exception in it

	ITEM	CATEGORY	EXCEPTION
(a)	Plasmodium, Cuscuta, Trypanosoma	Protozoan Parasites/	Cuscuta
(b)	Typhoid, Pneumonia, Diphtheria	Bacterial diseases	Diphtheria
(c)	UAA, UAG, UGA	Stop codons	UAG
(d)	Kangaroo, Koala, Wombat	Australian marsupials	Wombat

AIPMT (Mains)-2012

Ans. (a) : Plasmodium, Cuscuta, Trypanosoma all are parasites.

- Plasmodium and Trypanosoma both are protozoan and Cuscuta is an angiosperm plant and parasite also.

555. Which of the following grouping is correct?

(a) Amoeba, Paramecium, Plasmodium
(b) Tape worm, Liver fluke, Ascaris
(c) Butterfly, Cockroach, Oyster
(d) Parrot, King fisher, Rana

JIPMER-1999

Ans. (a) : Amoeba, Paramecium, Plasmodium belongs to the phylum Protozoa of kingdom Protista. They are colonial unicellular eukaryotic organism

- Tapeworm, Liver fluke belongs to Platyhelminthes Butterfly and Cockroach belongs to Arthopoda
- Parrot and Kingfisher belongs to aves.
- *Rana tigrina* belongs to amphibia.

556. In an experiments, an Amoeba was transfered from a container A to container B, Amoeba developed a contractile vacuole. However, the vacuole disappeared again when the Amoeba was transfered back to container A.
The container A and B respectively contained

(a) Fresh and marine water
(b) Marine and freshwater
(c) Both contained freshwater
(d) Both contained marine water

AMU -2000

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Ans. (b) : Container A and B contains marine water and freshwater respectively. When the marine amoeba or other protozona is placed in freshwater, it will develop contractile vacuole for osmoregulation. The formation of contractile vacuole ceases and disappearance of contractile vacuole takes place when again put back into marine water.

557. Phagocytosis was observed first time by:
(a) Huxley (b) Strassburger
(c) Metchnikoff (d) Haeckel

Uttarakhand-2005
BVP-2000

Ans. (c) : Phagocytosis was first time observed by Metchnikoff-
- Phagocytosis is a process by which a cell engulf a solid particles by forming as phagosome
- Phagocytosis are known as phagocytes or macrophages.
- Huxley - Father of taxonomy.
- Strassburger- Discovered cytoplasm.
- Haeckel - Recapitulation theory.

558. Kappa particles indicate:
(a) nuclear inheritance
(b) cytoplasmic inheritance
(c) mutation
(d) nucleo-cytoplasmic inheritance

JIPMER-2006

Ans. (b) : Kappa particles were discovered by Sonneborn.
- It is found in *Paramecium aurelia* and it produces toxins that kills many animals.
- It shows cytoplasmic inheritance. Nuclear inheritance occurs due to gene present on the chromosome.
- Kappa particle is denoted by 'K'.

559. The parasite of endothelial system of man is:
(a) Entamoeba (b) Schistosoma
(c) Taenia (d) Leishmania

AP EAMCET-2000

Ans. (d) : *Leishmania* is digenetic parasite. The primary host is man and secondary host is sandfly *(Phelobotamus)*.
- It is found in reticulo-endothelial system like liver, spleen, kidney and bone marrow. It causes the kala-azar.

560. Choose the correct statements with reference to reproduction in Paramecium
(I) The micronucleus divides by mitosis and the macronucleus by amitosis
(II) The micronucleus is polyploid and the macronucleus is diploid
(III) After karokinesis the parent cell divides into two daughter cells, anterior proter and posterior opisthe
(IV) It undergoes transverse binary fission during favorable conditions
(a) (I), (II) and (IV) (b) (II), (III) and (IV)
(c) (I), (III) and (IV) (d) (I), (II) and (III)

TS EAMCET-2015

Ans. (c) : The Paramecium reproduces asexually through binary fission. Here, the macronucleus splits by a type of amitosis and the micronuclei undergo mitosis during reproduction. The cell then divides transversally, and each new cell obtains a copy of the micronucleus and the macronucleus.

561. The phenomenon of metaboly is exhibited by
(a) Euglena (b) Noctiluca
(c) Physarum (d) Sponges

UP CPMT-2013

Ans. (a) : Euglena exhibits the phenomenon of metaboly, is wriggling type movement in which a wave of contraction and expansion passes from one end to other end of body.
- Many euglenoids can also glide and swim using their flagella.

562. Match the following and choose the correct combination from the options given

	Column I (Group Protista)		Column II (Example)
(A)	**Chrysophytes**	**(I)**	**Paramecium**
(B)	**Dinoflagellates**	**(II)**	**Euglena**
(C)	**Euglenoids**	**(III)**	**Gonyaulax**
(D)	**Protozoans**	**(IV)**	**Diatoms**

(a) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)
(b) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)
(c) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(d) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(e) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Kerala PMT-2008

Ans. (e) :
Chrysophytes - Diatoms
Dinoflagellates - Gonyaulax
Euglenoids - Euglena
Protozoans - Paramecium

563. Obligate parasites live :
(a) on living host only
(b) on living host and dead organic matter
(c) on dead organic matter only
(d) on artificial liquid medium

AIIMS-1999

Ans. (a) : The parasite that depends entirely on its host is called an **obligate parasite**. Obligate parasite has evolved a variety of parasitic strategies to exploit their hosts, holoparasite and some hemiparasites are obligate.

564. What is common about Trypanosoma, Noctiluca, Monocystis and Giardia?
(a) These are all unicellular protists
(b) They have flagella
(c) They produce spores
(d) These are all parasites

BHU PMT (Mains)-2010

Ans. (a) : Trypanosoma, Noctiluca, Monocystis and Giardia are all single celled and have well defined nucleus. Therefore, they belong to kingdom Protista.

565. Schistosoma is a parasite found in:
(a) testes of frog (b) liver
(c) intestine (d) blood

BVP-2003

Ans. (b) : *Schistosoma* is commonly called **blood fluke.** It causes a parasitic disease in human known as *Schistosomiasis*. It lives in the hepatic portal system and mesenteric blood vessels of human beings. The symptoms are diarrhoea, enlargement of liver and spleen, pain and fever.

566. Reproduction in Paramecium is controlled by:
(a) flagella (b) micronucleus
(c) macronucleus (d) cell wall

BVP-2001 / Manipal-2002

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Ans. (b) : Micronucleus controls reproduction in paramecium.
- Paramecium has two type nucleus-micronucleus and macronucleus.
- The macronucleus perform common cellular functions and micronucleus takes part in sexual reproduction.

567. The type of syngamy seen in Trichonympha is
(a) Conjugation (b) Hologamy
(c) Anisogamy (d) Isogamy

AP EAMCET-2014

Ans. (b) : The hologamy is the process where the adult individuals do not produce gametes, but they themselves act as gametes and fuse to form new individuals. For example: *Trichonympha.*

568. Which one of the following is not correctly matched
(a) Culex pipiens – Filariasis
(b) Aedes aegypti – Yellow fever
(c) Anopheles culifaciens – Leishmaniasis
(d) Glossina palpalis – Sleeping sickness

AIPMT-2004

Ans. (c) : Leishmaniasis is a vector born disease that is transmitted by sand flies and caused by Leishmania.
- Lieshmania also known as Kala-azar which is characterised by irregular bouts of fever, weight loss, enlargement of the spleen and liver and anemia.
- Most cases occurs in Brazil, east Africa and in India
- Cutaneous leishmaniasis is the most common form of leishmaniasis and causes skin lesions mainly ulcer.

569. Algae attached to stone is called
(a) epilithic (b) epifolic
(c) coenolithic (d) None of these

JCECE-2010

Ans. (a) : The epilithic algae grows on the surface of rocks.

570. A pathogen which cannot be cultured in an artificial medium is,
(a) protozoan (b) virus
(c) bacterium (d) fungus

KVPY (SA)-2013

Ans. (b) : A pathogen which cannot be cultured in an artificial medium is virus because these are obligate parasites and require living cells for the growth.

571. Cell wall is absent in:
(a) Amoeba (b) Chara
(c) Yeast (d) E. coli

AIIMS-2000

Ans. (a) : Cell wall is outer most covering of cell. It is absent in Amoeba. Amoeba have cell membrane instead of the cell wall.

572. The infective stage of Entamoeba histolytica is
(a) premature cyst (b) sporozoite
(c) trophozoite (d) mature cyst

UPCPMT-2009 / AIIMS-1998

Ans. (c) : Trophozoite and tetranucleated cyst is the infective stage of *Entamoeba histolytica* that enter by contaminated food and water
- It cause several disease amoebiasis (Diarrhoea and dysentery).

573. Trypanosoma causes sleeping sickness in man, it finally invades
(a) liver (b) blood
(c) brain (d) cerebro-spinal fluid

AIIMS-1998

Ans. (d) : Trypanosoma cause sleeping sickness in man, it finally invade cerebro-spinal fluid. Sleeping sickness is caused by *Trypanosoma brucei.*
- Trypanosoma is digentic parasite, primary host is man and secondary host is Tse-Tse fly.
- Symptoms of sleeping sickness - Iritation, swelling of brain, swelling of lymph node, mood change, skin rash, etc.

574. True nucleus is absent in :-
(a) Mucor (b) Waucheria
(c) Volvox (d) Anabaena

AIPMT-2015

Ans. (d) : True nucleus is absent in Anabaena. Anabaena is a prokaryotic organism. It is a cyanobacteria (blue green algae) which belong to kingdom Monera, all member of kingdom Monera are prokaryotic. Prokaryotes are the organism that lack a nucleus and other cell organelles. They have a region called **nucleoid** which contain the genetic material. All unicellular organism are prokaryotic.
Eukaryotic cells are cells that contains a nucleus and organelles, and are covered by a plasma membrane.

575. Carriers of Entamoeba histolytica are
(a) mosquito of genus, Anopheles
(b) cattle
(c) Musca domestica (housefly)
(d) healthy human host

UP CPMT-2007

Ans. (d) : Carrier of *Entamoeba histolytica* are healthy human host and housefly. *E. histolytica* is monogenetic i.e. only one host is required for its complete life cycle. It undergoes reproduction and complete, its life cycle only in man.

576. How many young amoebae hatch out from a cyst of E histolytica?
(a) One (b) Two
(c) Four (d) Six

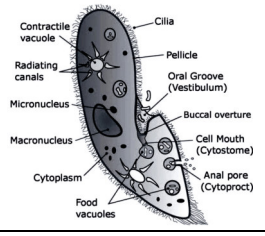
UP CPMT-2007

Ans. (a) : *Entamoeba histolytica* is a protozoan protest and is transmitted trough food or water contaminated with cysts. It is pathogenic in nature. In Entamoeba, a mature cyst is called quadric-nucleate cyst which has four nuclei and two chromatid bodies. Only one young Amoeba with four nuclei hatches out from a cyst of *Entamoeba histolytica.*

577. Which of the following unicellular organism has a macronucleus for trophic function and one or more micronuclei for reproduction –
(a) Trypanosoma (b) Paramecium
(c) Euglena (d) Amoeba

AIPMT-2005

Ans. (b) : Paramecium is unicellular and eukaryotic. They have two types of nuclei, **macronucleus** and **micronucleus**. The centre of all metabolic activities of the organism is macronucleus whereas micronucleus is a storage site for the genetic material of the organism.



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578. Mycorrhiza is an example of:-
(a) Symbiotic relationship
(b) Ectoparasitism
(c) Endoparasitism
(d) Decomposers

AIPMT-2003

Ans. (a) : The symbiotic association between the plant roots and fungi is known as **mycorrhiza.** The relationship between plants and fungi is symbiotic because the plant obtains phosphate and other minerals through the fungus, while the fungus obtains sugars from the plant root.

579. The protists have:
(a) only free nucleic acid aggregates
(b) membrane-bound nucleoproteins lying embedded in the cytoplasm
(c) gene containing nucleoproteins condensed together in loose mass
(d) nucleoprotein in direct contact with the rest of the cell substance

AIPMT-1994 / Karnataka CET-2001
Haryana PMT-2000

Ans. (b) : Protists are eukaryotes as they possess a nucleus and other membrane- bound organelles.
• Protists include all unicellular and colonial eukaryotes except those of green and red algae, In protists, the nucleic acid aggregates do not lie freely in the cytoplasm.
Hence, the Protists has membrane- bound nucleo-proteins lying embedded in the cytoplasm.

580. Genetic information in Paramecium is contained in:
(a) micronucleus
(b) macronucleus
(c) both micronucleus and macronucleus
(d) mitochondria

AIPMT-1990

Ans. (a) : In Paramecium, micronucelus is a tiny and compact structure, spherical in form. It has the function of preserving genetic stability and ensuring that the desired genes are passed on to the next generation, which is also called the **generative nucleus** or **germline.**

581. Trypanosoma belongs to Class:
(a) Sarcodina (b) Zooflagellata
(c) Ciliata (d) Sporozoa

AIPMT-1989

Ans. (b) : Trypanosoma are unicellular, flagellated protozoans that belong to the family Kinetoplastea. These zooflagellates are generally uninucleate, occasionally multinucleate. The body is covered by a firm pellicle.

582. Protists are
(i) unicellular and prokaryote
(ii) unicellular and eukaryote
(iii) multicellular and eukaryote
(iv) autotroph or heterotroph
(a) (i), (ii) and (iii) (b) (ii), (iii) and (iv)
(c) (iii), (iv) (d) (ii), (iv)

JIPMER-2005

Ans. (d) : Protists are eukaryotes as they possess a nucleus and other membrane-bound organelles, In the popular five kingdom scheme proposed by Robert Whittaker in 1969, Protista was defined as eukaryotic organisms which are unicellular and which form no tissues.
They can either be autotrophic or heterotrophic in nature.

583. Movements by pseudopodia of Amoeba are due to change in
(a) pressure (b) atmosphere
(c) temperature (d) viscosity

JIPMER-2008

Ans. (d) : Amoebas are unicellular protozoans that belong to the order amoeboid. The movement of amoeba is known as **amoeboid movement** and is a type of crawling movement.
• The process of amoeboid movement occurs by utilizing the cytoplasmic flow, or the force of the fluid inside cell. This serves to pull the cell in the forward direction. Amoeba's locomotory organ is pseudopodia. For producing the pseudopodia, the cytoplasm of a cell goes through the various biochemical changes.
So, it can be said that amoeboid movement is like rhythmic interaction which takes place between the viscosity of the cytoplasmic fluid in different areas of the cell.

584. Myxomycetes are
(a) Saprobes or parasites, having mycelia, asexual reproduction by fragmentation, sexual reproduction by fusion of gametes
(b) Slimy mass of multinucleate protoplasm, having pseudopodia-like structures for engulfing food, reproduction through fragmentation of zoospores
(c) Prokaryotic organisms, cellular or a cellular, saprobes or autotrophic, reproduce by binary fission
(d) Eukaryotic, single-celled or filamentous, saprobes or autotrophic, asexual reproduction by division of haploid individuals, sexual reproduction by fusion of two cells or their nuclei

AIIMS-2006

Ans. (b) : Myxomycetes are generally placed under Fungi but are also placed under Protista. They are known as **slime mould** and are surrounded by plasma membrane only. They are multinucleate, showing amoeboid-like nature(pseudopodia for engulfing food).
• Both sexual and asexual mode of reproduction is found. They produce spores within sporangia.
• Asexual reproduction is by fragmentation and sexual reproduction by spores.

585. One of the following is a connecting link between protozoans and poriferans
(a) Cliona (b) Leucosolenia
(c) Oscarella (d) Proterospongia

AIIMS-2011

Ans. (d) : Proterospongia is the connecting link between protozoans and poriferans.
• Proterospongia is a colonial choanoflagellate protozoan that closely resembles a sponge and act as connecting link between Protozoa and Porifera. It is a genus of single-celled aquatic organism which form colonies. It consists of a number of cells embedded in a jelly-like matrix.

586. One of these protozoans is threat to apiculture and sericulture
(a) Eimeria (b) Ceratium
(c) Nosema (d) Monocystis

AIIMS-2011

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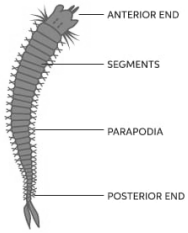
Ans. (c) : *Nosema* may be one-celled parasite. *Nosema* was discovered by Pasteur (1865), which causes chronic disease pebrine in silkworms and *Nosema* disease in honey bee. So, *Nosema* would be threat to sericulture and apiculture.

587. Which of the following is not the locomotory organ of Protozoa?
(a) Cilia (b) Flagella
(c) Parapodia (d) Pseudopodia

AFMC-2005

Ans. (c) : Parapodia are the locomotary organ of phylum Annelida, which are marine worms of belonging to class Polychaeta.
• Parapodia are usually the organ of locomotion used both in creeping and in swimming.



588. Which of the following pair is correct?
(a) E.coli-E. histolytica
(b) Culex-Elephantiasis
(c) Bed bug-Kala-azar
(d) Plasmodium-Sleeping sickness

BCECE-2005

Ans. (b) : Lymphatic filariasis, commonly known as elephantiasis, is a painful and profoundly disfiguring disease.
- The main symptom of Elephantiasis, is gross enlargement and swelling of area of body because of the accumulation of fluid.
- It is spreads from person to person through Culex mosquito.
- Elephantiasis is caused by parasitic worms that are spread by mosquito caused by organism *Wuchereria bancrofti.*

589. An intracellular parasite is
(a) Entamoeba (b) Ascaris
(c) Trypanosoma (d) Plasmodium

BCECE-2011

Ans. (d) : Plasmodium is a protozoan parasite i.e. complete their life-cycle into two host female Anopheles mosquito and mammals.
The *Plasmodium* lives as an intracellular parasite in liver cells and RBCs of man.

590. Which of the following is not a protist?
(a) Amoeba (b) Taenia
(c) Paramecium (d) Euglena

BCECE-2011

Ans. (b) : Taenia belongs to phylum Platyhelminthes and class Cestoda. It is found throughout the world and is most common in countries where pork is eaten.
- There are two form of human infection, one is primary hosting called **taeniasis** and is due to eating under-cooked pork that contains the cysts and results in adult worms in the intestine.
- The other form is called secondary hosting, **cysticercosis**, is due to eating contaminated food or water.

591. Which stages of Plasmodium are likely to be found in the stomach of a female Anopheles. Which has just taken a blood meal from a patient of malaria?
(a) Merozoites, trophozoites and gametocytes
(b) Sporozoites, trophozoites and gametes
(c) Merozoites, gametocytes and zygotes
(d) Gametocytes, ookinetes and gametes

BVP-2010

Ans. (a) : Plasmodium is known to infect the red blood cells in mammals like humans, birds, reptile etc.
• It causes a infectious disease known as malaria and transmitted by female anopheles.
• The merozoites infect red blood cells. The ring stage trophozoites mature into schizonts, which rupture releasing merozoites. Some parasites differentiate into sexual erythrocytic stages such that gametocytes.

592. Which is the characteristic feature of ookinete?
(a) It have microtubules
(b) It have more mitochondria and ribosomes
(c) It have contractile fibres
(d) It is non-motile

Rajasthan PMT-1996

Ans. (d) : An ookinete is the motile zygote that forms when the microgamete (derived from the male gametocyte) fertilizes the macrogamete (derived from the female gametocyte) during the sexual reproduction of certain sporozoans such as Plasmodium.
• The ookinete penetrates through the epithelial cells lining the midgut of the mosquito where it differentiates in to an oocyst.

593. In 1902 Nobel prize was given to :
(a) Grassi for observing plasmodium in RBC
(b) Laveron for discovering plasmodium
(c) Sir Ronald Ross for observing plasmodium
(d) Golgi for discovering eryhrocytic cycle

Rajasthan PMT-1996

Ans. (c) : Sir Ronald Ross was a British medical doctor who received the Noble prize for Physiology or Medicine in 1902 for his work on the transmission of malaria by the Anopheles mosquitoes and transmission of malaria parasites in humans.

594. Assistance provided during locomotion in Amoeba:
(a) Rough surface (b) Nematocyst
(c) Tantacles (d) Tons present in H_2O

Rajasthan PMT-1996

Ans. (a) : Amoeba's form temporary cell extensions called pseudopodia that are used for locomotion and feeding. The rough surface provides assistance to Amoeba during locomotion.

595. What conditions are optimum for activation of gametogenesis in Plasmodium in stomach/ alimentary canal of femal Anopheles?
(a) High temperature (b) Presence of enzymes
(c) Less temperature (d) Blood in stomach

Rajasthan PMT-1996

Ans. (c) : Both Anopheles and Plasmodium are sensitive to temperature because mosquitoes are ectotherms, each life stage is dependent on temperature in the development and mortality rate.
• Temperature is particularly critical, for example, at temperatures below 20^0C *Plasmodium falciparum* cannot complete its growth cycle in the Anopheles mosquito and thus can not be transmitted.

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596. Incubation period of *Plasmodium falciparum* is:
(a) 10 days (b) 12 days
(c) 16 days (d) 28 days
Rajasthan PMT-1996

Ans. (b) : The incubation period of *Plasmodium falciparum* is the shortest period compared with all the other Plasmodium species.
• Incubation periods of 9–14 days for the immune and 6–14 days for the non-immune have been reported for *Plasmodium falciparum*.

597. Amoeba lack:
(a) Centrosome (b) Mitochondria
(c) Ribosome (d) E.R.
Rajasthan PMT-1996

Ans. (a) : Amoeba is a unicellular organism that has ability to change its shape, it is usually found in pond, lake etc. A centrosome comprises two microtubule rings known as centrioles. Its main function is to organize the microtubules and provide a structure to the cell.
Centrosome is absent in amoeba.

598. Plant like nutrition is present in
(a) Amoeba (b) Paramecium
(c) Euglena (d) Plasmodium
UP CPMT-2003

Ans. (c) : Plant like nutrition is present in euglena. Euglena is a single-celled eukaryote organism. In euglena plant like nutrition present because pigment of euglenoid are identical to those present in higher plants.

599. The disease caused by Entamoeba gingivalis is spread through
(a) air (b) kissing
(c) housefly (d) Anopheles
Manipal-2011

Ans. (b) : Entamoeba has no cyst in its life cycle therefore, it is transmitted either directly via kissing or indirectly through trophozoite contaminated food toothpicks etc.
• Pyorrhea is caused by a protozoan called *Entamoeba gingivalis* which live in the oral cavities.

600. Lime-knots of slime moulds are :
(a) swarm cells (b) spore
(c) capillitia (d) fruit bodies
AFMC -2011

Ans. (c) : Lime-knots of slime moulds are capillitia. This is a cancerous network formed by the deposition of calcium carbonate. Capillita are the mass of sterile fibre inside the fruting body of slime moulds.

601. Sand fly spreads a particular type of disease by its :
(a) proboscis (b) mandible
(c) salivary gland (d) none of these
Manipal-2004

Ans. (a) : A **proboscis** is an elongated feeding tube attached to the head of an animal.
• The most well known example of a proboscis in insects is the feeding tube used by adult butterflies a mouth and sand fly.
• Many diseases such as, Kala-azar, visceral leishmaniasis, oriental sore etc. are spread by sand fly through proboscis.

602. Nucleus of Monocystis is :
(a) bilobed (b) spherical
(c) multilobed (d) bean shaped
Manipal-2004

Ans. (b) : Monocystis lives as an intracellular parasites in its young stage, when it lives in the bundles of developing sperms and becomes extracellular during maturity.
• The nucleus is large, vascular spherical or ellipsoidal in shape. It is placed more anterior in the upper half of the body.

603. Plasmodium is an :
(a) endoparasite (b) ectoparasite
(c) intercellular parasite (d) both a and b
Manipal-2004

Ans. (a) : Plasmodium is a unicellular protozoan, endoparasite as it lives inside the organs of host.
• Plasmodium parasites were first identified in the late 19th century by Charles Laveran.
• Plasmodium parasite is transmitted through the bite of a female Anopheles mosquito and causes malaria.

604. Sexual mode of reproduction in Protozoa is :
(a) Anisogamy (b) Plasmogamy
(c) Plasmotomy (d) Schizogony
Uttarakhand PMT-2004

Ans. (a) : Sexual mode of reproduction in Protozoa is anisogamy. It involves fusion of gametes of different size. The small and motile gametes are male gametes and the large non-motile ones are the female gametes.

605. Octanucleated cyst stage is found in:
(a) Entamoeba coli (b) Entamoeba histolytica
(c) Leishmania (d) Trypanosoma
JIPMER-1997

Ans. (b) : Octanucleated cyst stage is found in *Entamoeba histolytica*. In octanucleated cystic form, the glycogen vacuole is reabsorbed. The nuclei may replicate until it has 16 nuclei in total.

606. The protists have:
(a) membrane bound nucleoproteins lying embedded is the cytoplasm
(b) gene containing nucleoproteins condensed together in loss mass
(c) nucleoproteins is direct contact with the rest of the cell substance
(d) only free nucleic acid aggregates
VMMC-2002

Ans. (a) : Protists are unicellular eukaryotic organisms. Membrane bound nucleoproteins are present in them. The nucleus is embedded in the cytoplasm.

607. Which of the following is a slime mould?
(a) Rhizopus (b) Physarum
(c) Thiobacillus (d) Anabaena
Rajasthan PMT-2010

Ans. (b) : Physarum is a myxomycete or plasmodial slime mould. The fruiting bodies (sporangia) are characterized by the presence of abundant amount of calcium salt. The order comprises 142 species which are placed under 12 genera.

608. Animal cell in which centrosome is not present is of
(a) Amoeba (b) Paramecium
(c) Trypanosoma (d) Plasmodium
AMU-1998

Ans. (d) : Centrosome is not present in Plasmodium.
The Plasmodium parasite that causes malaria is neither a virus nor a bacteria. It is a single-celled parasite that multiplies in red blood cells of humans as well as in the mosquitoes intestine.

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609. Thigmotaxis is not shown by
(a) Paramecium (b) Amoeba
(c) Ascaris (d) Hydra
VMMC-2012

Ans. (c) : Ascaris do not show thigmotaxis as it is the internal parasite of humans. It is the most common worm for producing infection in humans.

610. Protozoan, Protista are differentiated on the basis of
(a) nuclei (b) size
(c) shape (d) locomotory structures
CG PMT-2007

Ans. (d) : Phylum protozoa is classified on the basis of locomotory organelles.
• Protozoans are believed to be primitive ancestors of animals belonging to the kingdom Protista. They are classified into four groups.

611. The type of pseudopodia seen in Lecithium is:
(a) axopodia (b) reticulopodia
(c) filopodia (d) lobopodia
AP EAMCET-2003

Ans. (c) : The type of pseudopodia seen in Lecithium is filopodia.
• It is a variety of pseudopodia according to appearance. They are actin -rich protrusion of plasma membrane, consisting mainly of ectoplasm and are more slender and filiform with pointed ends. They are supported by microfilaments. This is seen in Euglypha and Lecithium.

612. The intermediate host of the parasite that causes Tashkent ulcers is:
(a) Glossina palpalis
(b) Phlebotomus argentipes
(c) Phlebotomus papatassi
(d) Triatoma infestans
AP EAMCET-2004

Ans. (c) : The intermediate host for parasite which causes the Tashkent ulcer is *Phlebotomus papatassi*. The Tashkent ulcer is also known as cutaneous ulcer.

613. Study of protozoans is called:
(a) Parazoology (b) Protozoology
(c) Zoology (d) None of these
Haryana PMT-2002

Ans. (b) : Study of protozoan is called as protozoology. They are considered to be a subkingdom of Protista. They are free-living organisms that are found in almost every habitat.

614. The disease oriental sore is caused by :
(a) bacteria (b) virus
(c) protozoa (d) fungus
Haryana PMT-2004

Ans. (c) : Cutaneous leishmaniasis is the most common form of leishmaniasis affecting humans and causes oriental sore. It is a tropical condition which is caused by the single-celled microscropic parasite and its transmission takes place by the bite of the sandfly.

615. The structure in Amoeba functionally similar to human kidney is
(a) nucleus (b) plasmodesmata
(c) plasma membrane (d) contractile vacuole
AMU-2006

Ans. (d) : In amoeba, excretory waste such as ammonia is collected by contractile vacuole from the intra cellular fluid by both active transport and diffusion.
• The excretory organ of the amoeba is a contractile vacuole as the excretory organ is kidney of the human.

616. Protista includes :
(a) dinoflagellates, Amoeba, Paramecium
(b) mushroom, Paramecium, Euglena
(c) Hydra, Amoeba, Paramecium
(d) Yeast, Euglena, dinoflagellates
J&K CET-2006

Ans. (a) : Dinoflagellates are member of phylum pyrrophyta of kingdom Protista whereas Amoeba and paramecium belong to phylum protozoa of kingdom protista.

617. Nucleus of Monocystis is
(a) bilobed (b) spherical
(c) multilobed (d) bean shaped
AMU-2005

Ans. (b) : The nucleus is large, vascular and ovoid or spherical in Monocystis. It lies towards the anterior end and is bounded by a distinct nuclear membrane. It contains one or sometimes two nucleoli, endosomes or karyosomes.

618. Which is false for nutrition in Amoeba ?
(a) Omnivorous (b) Pseudopodia feeder
(c) Holozoic nutrition (d) Photoautotroph
AMU-2009

Ans. (d) : Nutrition in an Amoeba is accomplished through a process known as **phagocytosis**, in which the entire organism completely engulfs the food, it intends to consume . The term "holozoic nutrition" refers to the mode of nourishment used by Amoeba.

619. The number of daughter Vorticella formed after the second series of post-conjugation fissions is
(a) seven (b) six
(c) four (d) two
VMMC-2010

Ans. (a) : The number of daughter Vorticella formed after the second series of post conjugation fission are 7, each contains a macronucleus and a micronucleus.

620. Who has proposed the sol gel theory for amoeboid movement explanation?
(a) Pantin (b) Goldacre and love
(c) Hyman (d) Mast
BVP-2013

Ans. (c) : Sol gel theory was strongly advocated by Hyman (1971) and also adopted by Pantin (1923-1926) and Mast (1925). It is supposed to be the best to explain the locomotion in Amoeba. This theory is based on the reversible change of protoplasm from sol to gel state.

621. In Amoeba who gave contraction hydraulic theory ?
(a) Schultze (b) Claude
(c) Simpson (d) Swan
Rajasthan PMT-2000

Ans. (a) : Earlier it was given by Schultze and detailed explanation was given by Rinaldi. It explains how sol moves in the direction of locomotion. According to this, actin and myosin type of proteins are present in rear portion of Amoeba. Phase proteins produce hydraulic pressure by contraction. This pressure is maximum in front, minimum in middle and medium in rear.

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622. In Plasmodium which one of the following is not distinct ?
(a) Mitochondria (b) Golgi body
(c) Cilia (d) Nucleus
Rajasthan PMT-2000

Ans. (c) : The Plasmodium does not possess cilia. Plasmodium is a large genus of parasite protozoa. This parasite has two hosts in its life cycle, a mosquito vector, and a vertebrate host. It has all the organelles like mitochondria, golgi body, and nucleus. However, it does not possess cilia.

623. An example of terrestrial protozoan is:
(a) Vorticella (b) Giardia
(c) Didymium (d) Plasmodium
AP EAMCET-1999

Ans. (c) : Didymium is an example of terrestrial protozoan.
• 'Terrestrial protozoa' are ubiquitous limnetic species tolerant of high CO_2 tensions and possessing efficient encystment mechanisms. Protozoa exploit tiny micro habitats unavailable to larger animals (e.g. nematodes).

624. Diatoms belong to which class?
(a) Phaeophyceae (b) Bacillariophyceae
(c) Chlorophyceae (d) Xanthophyceae
BCECE-2008
UP CPMT-2007

Ans. (b) : Diatoms are placed in Protista as they are unicellular and eukaryotic. Diatoms are formally classified as belonging to the division Chrysophyta, class Baciliariophyceae.

625. Why Amoeba has been kept in Protozoa?
(a) Due to contractile vacuole
(b) Because of nutrition being insectivorous
(c) Cell wall
(d) Unicellular body
BCECE-2002

Ans. (d) : Protozoa is a group of microscopic, and unicellular, eukaryotic animalcules without tissue and organs, having one or more nuclei. The contractile vacuole is for osmo-regulation. Amoeba is carnivorous and its mode of nutrition is holozoic i.e. it feed by phagocytosis.

626. The beautiful diatoms and desmids are placed under
(a) Chrysophytes (b) Dianoflagellates
(c) Euglenoids (d) Slime moulds
AMU-2012

Ans. (a) : Crysophytes belong to kingdom Protista. Chryosophytes are a group of algae commonly formed in lakes. They are sometimes referred to as gloden-brwon algae due to coloration from specific photosynthetic pigment. Chrysophytes are protists that resemble plants and are typically found in fresh water and marine habitats with low calcium.
• Chrysophytes are photosynthetic.

627. Diatoms float in water because they have
(a) flagella on the one end of the body
(b) flagella on the both ends of the body
(c) wing like structure in middle of the body
(d) light storage lipids in the body
AMU-2001

Ans. (c) : Diatoms are microscopic organisms of various colours and diverse forms. They are both aquatic and terrestrial. The aquatic forms are both freshwater and marine. Their chief characteristic is the silicified cell wall, consisting of two overlapping halves which are characteristic secondary structures.

628. Which of the following are the characters of Dinoflagellates?
1. Planktonic golden yellow algae with soap box like structure
2. Marine red biflagellated Protista
3. Appear yellow, green, brown, blue and red in colour
4. Biflagellated organisms with pellicle
5. Saprophytic(or) parasitic unicellular forms
(a) 1, 2 and 3 only (b) 2, 4 and 5 only
(c) 2 and 3 only (d) 2 and 5 only
(e) 3, 4 and 5 only
Kerala PMT-2012

Ans. (c) : Dinoflagellates are primarily found in marine waters and are photosynthetic. These creatures tend to move around and flagellate most frequently. Normally these have two flagella. There normally these have two fagella. Therefore, they are also known as biffagellates.
When blooming, dinoflagellates can be responsible for 'red tides'. So called because the large density of cells in the surface water induces a colour changes green, brown or red.

629. Diatoms do not decay easily because
(a) they have siliceous walls
(b) their body is impervious to water
(c) they are chitinous
(d) they are abundant in saline soil
AIIMS-2011

Ans. (a) : Diatoms do not decay easily because the wall are embedded with silica and thus the walls are indestructible. Thus, diatoms have left behind large amount of cell wall deposits in their habitat, this accumulation over billions of year is referred to as diatomaceous earth.

630. 'Red tide' is caused by
(a) Gonyaulax (b) Ceratium
(c) Triceratium (d) All of these
AIIMS-2014
VMMC-2014

Ans. (a) : Red tide is caused by gonyaulax.
Algal blooms, commonly referred to as red tides, are brought on by the rapid growth and buildup of microscopic algae (dianoflagelette), which while growing from a bunch like structure known as an algal bloom.
- Gonyaulax is a dinoflagellates and sometimes the number of these dinoflagellates increases tremendously in the sea.
- Ceratium is one on few dionflagellates which show sexual reproduction (Reproduction is by zygotic meiosis). Ceratium is not responsible for causing red tides.
- Triceratium too is not responsible for causing red tides.

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D. Fungi

631. The reserved food of Albugo is:
(a) glycogen (b) cellulose
(c) starch (d) None of these
Haryana PMT-2010 / UP CPMT-2010
AMU-2009 / AFMC-2007
Rajasthan PMT-1996

Ans. (a) : Albugo the only genus of family Albuginaceae and is represented by more than 25 species. It has reserve food material in the form of oil drops and glycogen bodies.

632. Lomasomes are found in :
(a) algal cell (b)fungal cell
(c) yeast (d)E.coli
AP EAMCET-2011 / BVP-2000
Manipal-2002 / Haryana PMT-2001

Ans. (b) : Lomasome term coined by Moore and McAlear (1961). The outfolding at the plasma membrane in fungi is called the **lomasome**.
• Lomasomes are the membranous structure found between the cell wall and plasma membrane. They facilitate vesicular transport and increase the surface area.

633. Late blight of potato is caused by
(a) Ustilago
(b) Pseudomonas
(c) Phytophthora infestans
(d) Colletotrichum falcatum
BCECE-2010
Haryana PMT-2009
MGIMS Wardha-2008
AMU-1996

Ans. (c) : Late blight of potato is caused by *Phytophthora infestans*. It is an oomycete or water mould. It is a lethal disease which can have the potential to devastate the crop.

634. Cell wall of fungi is made up of
(a) fungal cellulose (b) hemicellulose
(c) fungal chitin (d) Both 'a' and 'c'
UP CPMT-2009 / JIPMER-2018
Rajasthan PMT-1997 / JIPMER-2011

Ans. (d) : The cell wall of fungi is made up mainly of glucans, chitin, and glycoproteins. Cellulose is the primary compound of the cell walls of the plant cell, and chitin is the primary compound of the cell walls of the fungi and exoskeletons of arthropods.
• Chitin is a complex homopolysaccharide and the second most abundant organic substance. It is found as the structural component of fungal walls and is also called **fungal cellulose**.
• Hemicellulose is a major component of plant cell walls. It is also known as **polyose**. They contribute in strengthening the cell wall by interacting with cellulose and, in some walls, with lignin.

635. Puffballs belongs to the following class
(a) Phycomycetes (b) Ascomycetes
(c) Basidiomycetes (d) Deuteromycetes
TS EAMCET-11.05.2023, Shift-I

Ans. (c) : Basidiomycetes are commonly known as mushroom *(Agaricus)*, bracket fungi or puffballs.
These fungi are found in soil or on decaying wood in grassy areas and woods.
They are named so because clouds of dust-like brown spores are release when the mature fruiting body bursts.

636. Identify the asexual reproductive structure associated with *Penicillium*:
(a) Buds (b)Zoospores
(c) Conidia (d)Gemmules
NEET-2022

Ans. (c) : Conidia are the asexual reproductive structures found in *Penicillium*.
• Buds are found in *Hydra*.
• Zoospores are found in *Chlamydomonas*.
• Gemmules are found in *Sponges*.

637. The enzyme (A) is needed for isolating genetic material from plant cells and enzyme (B) for isolating genetic material from fungus. Choose the correct pair of options from the following:
(a) (A) Cellulase (B) Protease
(b) (A) Cellulase (B) Chitinase
(c) (A) Chitinase (B) Lipase
(d) (A) Cellulase (B) Lipase
NEET (Re-Exam)-04.09.2022

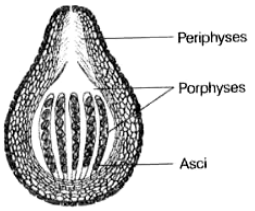
Ans. (b) : The enzyme cellulase is needed for isolating genetic material from plant cells and enzyme chitinase is required for isolating genetic material from fungus.

638. Deuteromycetes is called as Imperfect fungi because
(a) Sexual reproduction is absent
(b) Mycellium is monokaryotic and septate
(c) The fruitingbody is ascocarp
(d) They are saprophytes
AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Dueteromycetes are called imperfect fungi because sexual reproduction is absent, only the asexual and vegetative phases of these fungi are known.
⇒ The dueteromycetes reproduce only by asexual spores known as conidia, and the mycelium is septate and branched.

639. Perithecium is characterized by
(a) Un opened globose fruiting body
(b) Flask-shaped fruiting body without opening
(c) Flask-shaped fruiting body with apical opening
(d) Cup-shaped fruiting body
AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Perithecium is characterized by flask shaped fruiting body with an apical opening e.g. *Cleviceps purpurea.*



Perithecium

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640. Match the following lists:

List-I	List-II
(A) Coprophilous	I. Trichoderma
(B) Karyogamy and meiosis occur in sac-like structures	II. Mucor
(C) Flask shaped fruiting bodies with an apical opening	III. Puccinia
(D) Asexual reproduction takes place by aplanospores	IV. Peritheciu m
	V. Dung
	VI. Penicillium
	VII. Alternaria

The correct match is:

	A	B	C	D
(a)	V	III	VII	II
(b)	VII	VI	I	III
(c)	III	I	IV	II
(d)	V	VI	IV	II

TS EAMCET-10.08.2021 Shift-I

Ans. (d) :

(A)	**Coporhilious**	**Dung**
(B)	**Karyogamy and meiosis occur in sac-like structures**	**Penicillium**
(C)	**Flask shaped fruting bodies with an apical opening**	**Peritheciu m**
(D)	**Asexual reproduction takes place by aplanospores**	**Mucor**

641. Identify the organism which did not cause ringworm?

(a) Microsporum (b) Trichophyton
(c) Epidermophyton (d) Trichonympha

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : Ringworm is not causes by *Trichonympha*. It is a genus of single celled, anaerobic parabasalids of the order Hypermastigia, that is found exclusively in the hindgut of lower termites and wood roaches.

- **Microsporum-** Microsporum is a genus of fungi that causes *Tinea capitis, Tinea corporis*, ring-worm, and other dermatophytosis. Microsporum forms both macroconidia and microconidia on short conidiophores.
- **Tricophyton-** Trichophyton is a genus of fungi, which includes the parasitic varieties that cause Tinea, including athletes foot, ringworm, Jock itch, and similar infections of the nail, beard, skin and scalp. Trichyphyton fungi are molds characterized by the development of both smooth-walled macro and microconidia.
- **Epidermophyton-** Epidermophyton is a genus of fungus causing superficial and cutaneous mycoses, including *E. floccosum* and causes *Tinea corporis, Tinea cruris, Tinea pedis* etc.

642. Match the following fungi scientific names with their alternate names ?

Column-I	Column-II
(A) Ustilago	(i) Bracket
(B) Puccinia	(ii) Puff ball
(C) Polyepores	(iii) Mushroom
(D) Lycoperdon	(iv) Smut
	(v) Rust

Options:

	A	B	C	D
(a)	(iv)	(v)	(i)	(ii)
(b)	(v)	(i)	(ii)	(iii)
(c)	(i)	(ii)	(iii)	(iv)
(d)	(v)	(iv)	(iii)	(ii)

AP EAMCET-03.09.2021 Shift-II

Ans. (a)

Scientific Names	Alternate Names
(a) Ustilago	Smut
(b) Puccinia	Rust
(c) Polyepores	Bracket
(d) Lycoperdon	Puff ball

643. Organisms which are eukaryotic, non-cellulosic cell wall, heterotrophic belongs to _____

(a) Monera (b) Protista
(c) Mycota (d) Plantae

AP EAMCET-03.09.2021 Shift-II

Ans. (c) : Kingdom Mycota consists of eukaryotic organisms with non-cellulosic cell wall. They lack chlorophyll hence can't prepare their own food, hence also called as **heterotrophic**.

644. Identify the odd one out.

(a) Ustilago (b)Alternaria
(c) Colletotrichum (d)Trichoderma

Karnataka CET-2021

Ans. (a) : *Ustilago* belongs to class Basidiomycetes (Club fungi) which causes loose smut and covered smut of disease.

- *Alternaria*, *Colletotrichum* and *Trichoderma* are belongs to Deuteromycetes (Imperfect fungi).
- *Alternaria* causes early blight of potato.
- *Colletotrichum falcatum* causes red rot of sugarcane.
- *Trichoderma* is used for reducing the occurrence of plant disease.

645. Which among the following do not form asexual spores usually?

(a) Deuteromycetes (b) Basidiomycetes
(c) Ascomycetes (d) Phycomycetes

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Basidiomycetes are called **club fungi**. They generally do not show asexual spores. Instead, they produce their sexual spores, called **basidiospores**, on a club-shaped, spore-producing structure called a **basidium**.

646. The saprophytes like bacteria, actinomycetes and fungi are

(a) pioneers in ecological succession.

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(b) climax communities in ecological succession.
(c) macro-consumers in an ecosystem,
(d) micro-consumers in an ecosystem.

MHT CET-07.10.2020 Shift-I

Ans. (d) : The saprophytes like bacteria, actinomycetes and fungi are micro-consumers in an ecosystem. Fungi along with some types of bacteria, belong to a group of microorganisms called saprophytes. These organisms play an important role in their ecosystem, making it possible for plants to thrive.

647. Column-I consists of names of fungi classes while Column-II consists of names of genera. Find out the correct option.

	Column-I		Column-II
I.	Phycomycetes	p.	Alternaria, Trichophyton
II.	Ascomycetes	q.	Agaricus, Puccinia
III.	Basidiomycetes	r.	Mucor, Rhizopus
IV.	Deuteromycetes	s.	Aspergillus, Penicillium

(a) I - r, II - s, III - q, IV - p
(b) I - p, II - q, III - r, IV - s
(c) I - q, II - r, III - s, IV - p
(d) I - s, II - r, III - p, IV - q

MHT CET-07.10.2020 Shift-I

Ans. (a) :
(I) Phycomycetes → Mucor, Rhizopus
(II) Ascomycetes → Aspergillus, Penicillium
(III) Basidiomycetes → Agaricus, Puccinia
(IV) Deuteromycetes → Alternaria, Trichophyton

648. Vernalization increases the resistance of plants for diseases caused by _____.

(a) Bacteria (b) Viroids
(c) Viruses (d) Fungi

MHT CET-06.10.2020 Shift-I

Ans. (d) : Vernalization increases the resistance of plant for disease caused by fungi. It increases the cold resistance of plants. The period of cold treatment is of few days to many weeks.

649. Fungus without any mycelium is _____

(a) Albugo (b) Phytophthora
(c) Agarius (d) Saccharomyces

AP EAMCET-24.09.2020 Shift-I

Ans. (d) : *Saccharomyces* is a genus of Fungi that includes many species of yeast. It is a unicellular and microscopic fungus in which hyphae or mycelium is absent. It is belong to the class Saccharomycetes. It is also known as **sugar fungus** and mainly participate in fermentation.

650. In which of the following group are *Neurospora* and *Penicillium* included?

(a) Phycomycetes (b) Basidiomycetes
(c) Zygomycetes (d) Ascomycetes

AP EAMCET-24.09.2020 Shift-I

Ans. (d) : Ascomycetes are commonly known as **sac fungi**. They produce spores through sac shaped cells called **Ascus**. They constitute the largest phylum of the kingdom Fungi.
Example– *Neurospora, Penicillium*

651. Which of the following is called "Drosophila of plant kingdom"?

(a) *E.coli* (b) *Acetabularia*
(c) *Neurospora* (d) *Chlorella*

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : *Neurospora* is a genus of Ascomycete fungi. It is also called as **"Drosophila of plant kingdom"**. The genus name meaning "nerve spore" refers to the characteristic striations on the spores that resemble axons of a nerve. The best – known species of this genus is *Neurospora crassa,* which is used commonly as a model organism in biological.

652. Match the following:

	Column –I		Column - II
1.	*Trichoderma*	i.	Citric acid
2.	*Saccharomyces*	ii.	Acetic acid
3.	*Aspergillus Niger*	iii.	Statins
4.	*Acetobacter*	iv.	Toddy

(a) (1– iii), (2 – ii), (3 – iv), (4 – i)
(b) (1– iv), (2 – iii), (3 – ii), (4 – i)
(c) (1– ii), (2 – i), (3 – iii), (4 – iv)
(d) (1– iii), (2 – iv), (3 – i), (4 – ii)

AP EAMCET-24.09.2020 Shift-I

Ans. (d) :

Column-I		Column-II
1. *Trichoderma*	–	(iii) Statins
2. *Saccharomyces*	–	(iv) Toddy
3. *Aspergillus Niger*	–	(i) Citric acid
4. *Acetobacter*	–	(ii) Acetic acid

653. Yeast cell can progress through the cell cycle in about———

(a) 20 hours (b) 24 hours
(c) 90 minutes (d) 60 minutes

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : Yeast cell can progress through the cell cycle in about 90 minutes. The duration of the cell cycle depends on the type of cell and external factors such as temperature, nutrients and oxygen supply. A bacterial cell can be divided in 20 minutes and a yeast cell can take approximately 90 minutes to divide.

654. Match the following

Transgenic Plant		Resistant to	
a.	Potato	i.	Herbicide tolerant
b.	Tomato	ii.	Phytophthora
c.	Basmati rice	iii.	Pseudomonas
d.	Roundup ready soya bean	iv.	Biotic, abiotic stress

(a) (a – ii), (b – iii), (c –iv), (d –i)
(b) (a – i), (b – ii), (c –iii), (d –iv)
(c) (a – ii), (b – iii), (c –i), (d –iv)
(d) (a – i), (b – ii), (c –iv), (d –iii)

AP EAMCET-24.09.2020 Shift-I

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Ans. (a) :

Transgenic plant	Resistant
a. Potato	– Phytophthora
b. Tomato	– Pseudomonas
c. Basmati rice	– Biotic, abiotic stress
d. Roundup ready soya bean	– Herbicide tolerant

655. Which of the following statements is incorrect?

(a) Claviceps is a source of many alkaloids and
(b) Conidia are produced exogenously and ascospores endogenously.
(c) Yeasts have filamentous bodies with long thread-like hyphae.
(d) Morels and truffles are edible delicacies.

NEET-2019

Ans. (c) : Yeast is solitary cell or unicellular living being known as *Saccharomyces* because it is unicellular and lacks filamentous structure, however, it forms a short temporary filamentous structure called **pseudo-mycelium.**

656. Match the column

Column I	Column II
(i) Tricoderma	**(A) Deuteromycetes**
(ii) Yeast	**(B) Basidiomycetes**
(iii) Bread mould	**(C) Phycomycetes**
(iv) Smut	**(D) Ascomycetes**

(a) i–D, ii–A, iii–C, iv–B
(b) i–A, ii–D, iii–B, iv–C
(c) i–A, ii–D, iii–C, iv–B
(d) i–A, ii–C, iii–B, iv–D

AIIMS-25.05.2019 Shift-II

Ans. (c) :

Column-I	Column-II
(i) Tricoderma	(A) Deuteromycetes
(ii) Yeast	(D) Ascomycetes
(iii) Bread mould	(C) Phycomycetes
(iv) Smut	(B) Basidiomycetes

657. Match the column-I and column-II

Column-I	Column-II
(i) *Agaricus*	**(A) Ascomycetes**
(ii) *Colletotrichum*	**(B) Deuteromycetes**
(iii) *Albugo*	**(C) Phycomycetes**
(iv) *Neurospora*	**(D) Basidiomycetes**

(a) i–B, ii–A, iii–C, iv–D
(b) i–A, ii–B, iii–D, iv–C
(c) i–C, ii–B, iii–D, iv–A
(d) i–D, ii–B, iii–C, iv–A

AIIMS-26.05.2019 Shift-II

Ans. (d) :

(i)	*Agaricus*	(D)	Basidiomycetes
(ii)	*Colletotrichum*	(B)	Deuteromycetes
(iii)	*Albugo*	(C)	Phycomycetes
(iv)	*Neurospora*	(A)	Ascomycetes

658. A student while extracting DNA from <u>Aspergillus</u> fungus requires _____ enzyme to break open the cell wall.

(a) Lysozyme (b) Chitinase
(c) Cellulase (d) Pectinase

Karnataka CET-2019

Ans. (b) : Aspergillus is a fungus and their cell wall is made up of chitin, isolation of DNA from Aspergillus fungus need the enzyme chitinase to break open the cell wall.

659. Morphologically and Physiologically similar and usually motile and flagellated gametes are known as _____ and its correct example?

(a) Isogamete, Fucus
(b) Isogamete, Cladophora.
(c) Anisogamete, Spirogyra
(d) Anisogamete, Human gametes

GUJCET-2018

Ans. (b): Morphologically and Physiologically similar and usually motile and flagellated gametes are known as **isogamete** such as *Cladophora*.

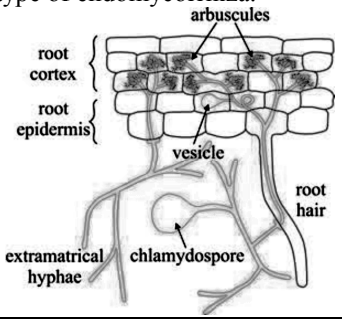
Isogametes, involves the fusion of gametes which do not differ morphologically but may be different physiologically. Such gametes are called Isogametes. **Ex– Cladophora.**

660. VAM is

(a) endomycorrhiza (b) ectomycorrhiza
(c) bioinsecticide (d) bioherbicide

SRM JEEE-2018

Ans. (a) : VAM full form is **Vesicular arbuscular mycorrhiza** which is formed due to the symbiotic association between certain fungi and angiospermic roots. It is a type of endomycorrhiza.



661. After karyogamy followed by meiosis, spores are produced exogenously in

(a) Neurospora (b) Alternaria
(c) Saccharomyces (d) Agaricus

NEET-2018

Ans. (d) : In Basidiomycetes (Agaricus), meiospores are produced exogenously after karyogamy and meiosis.

- In Agaricus, the fusion of two vegetative cells, a club-shaped structure is formed on every cell (basidium). After that, both the nuclei come into this basidium and fuse with each other and further, meiosis takes place as a result of which four haploid spores are formed on every basidium.
- Neurospora is a genus of ascomycetes that produces ascospores as meiospores but endogenously inside the ascus.
- Alternaria a genus of deuteromycetes does not produce sexual spores.
- Sacchromycetes produces ascospores endogenously.

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662. Which of the following has chitinous cell wall ?
(a) Mycoplasma (b) Archaea
(c) Fungi (d) Bacteria

Tripura JEE-2017
Punjab MET-2008

Ans. (c) : Fungi body structure is unique. They are eukaryotes that lack chlorophyll. The fungal cell wall is made up of complex polysaccharides such as chitin, glycan and glycoproteins.

663. Macromolecule chitin is
(a) Nitrogen containing polysaccharide
(b) Phosphorous containing polysaccharide
(c) Sulphur containing polysaccharide
(d) Simple polysaccharide

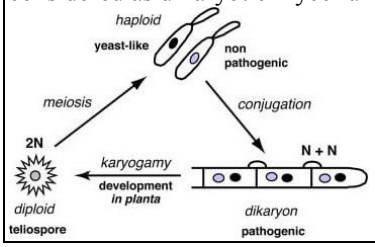
JIPMER-2017

Ans. (a) : Chitin is natural complex polysaccharide. It is linear polymer composed of repeating β (1, 4)- N-acetyl-glucosamine units (Nitrogen containing polysaccharide). It is composed of proteins and carbohydrates. It is a complex carbohydrate, similar to cellulose.

664. Dikaryotisation (n+n) in Agaricus is brought about by
(a) Clamp connections
(b) Somatogamay between two hyphae of different strains
(c) Both (a) and (b) are correct
(d) Basidiospores

AIIMS-2017

Ans. (c) : Dikaryotisation (n+n) in *Agaricus* is brought about by clamp connections and somatogamay between two hyphae of different strains.
The vegetative part of the mycelium consist of two filamentous hyphae that produces the basidiospores.
• In the beginning, the hyphae are nucleated but later two strains of hyphae are formed and both of them come in contact, as a result the nucleus passes from one to the other this process is termed as **somatogamy**. The cells become dikaryotic after the division by clamp and considered as dikaryotic mycelium.



665. Which of the following is correctly matched for the product produced by them?
(a) *Acetobacter aceti* : Antibiotics
(b) *Methanobacterium* : Lactic acid
(c) *Penicillium notatum* : Acetic acid
(d) *Saccharomyces cerevisiae* : Ethanol

NEET-2017

Ans. (d) : *Saccharomyces cerevisiae* is also called **Baker's yeast** and it used in the fermentation of sugars to produce ethanol and carbon dioxide.
• *Acetobacter aceti* produce acetic acid.
• *Methanobacterium* produce methane.
• *Penicillium notatum* and streptococcus produce antibiotics penicillin and streptomycin respectively.

666. Among plants, Pheromones are secreted by the cells of the following plants for given function:
(a) all plants for growth and development
(b) yeast for facilitating mating
(c) all fungi for sexual reproduction
(d) Rhizopus for formation of zygospore

Haryana PMT - 2005
BHU PMT-2003

Ans. (b) : Pheromones are also called **ectohormones** substance that are secreted outside by an individual and received by a second individual of the same species in which it induces a specific reaction.
• Pheromones may play a role in mate selection, which is "disassortative" regarding the human leukocyte antigen- (HLA) genotype.

667. Match column I with Column II and select the correct option using the codes given below.

Column I	Column II
A. Citric acid	**1. Trichoderma**
B. Cyclosporin A	**2. Clostridium**
C. Statins	**3. Aspergillus**
D. Butyric acid	**4. Monascus**

(a) A-3 B-1 C-2 D-4
(b) A-3 B-1 C-4 D-2
(c) A-1 B-4 C-2 D-3
(d) A-3 B-4 C-1 D-2

NEET-2016 Phase-II

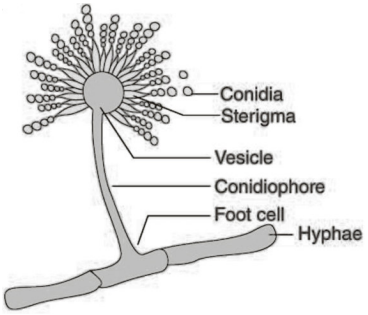
Ans. (b) :

Column-I		Column-II
A. Citric acid	–	(3) Aspergillus
B. Cyclosporin A	–	(1) Trichoderma
C. Statins	–	(4) Monascus
D. Butyric acid	–	(2) Clostridium

668. Which of the following secretes toxins during storage conditions of crop plants : -
(a) Aspergillus (b)Penicillium
(c) Fusarium (d)Colletotrichum

AIPMT-2002

Ans. (a) : Aspergillosis is an infection caused by Aspergillus (Black mould). It is usually found outdoor in dead leaves on plants. Aspergillus can cause allergic reactions, and invasive disease that spread to our brain, kidney, lungs, or causes asthma on inhaling their fungal spores.



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669. The zygospore in Rhizopus develops into:
(a) zygospore (b) progametangium
(c) promycelium (d) gametangium
J&K CET-2002

Ans. (c) : The male (+) and female (–) gametangia fuse in Rhizopus, and the gametangial copulation leads to the formation of a zygospore, which contains many pairs of nuclei. These pairs of nuclei fuse to produce diploid nuclei, while others degenerate.
On germination, the inner layer comes out after cracking the outer walls and produces a promycelium.

670. Which is unicellular fungus?
(a) Yeast (b) E. coil
(c) Nostoc (d) Albugo
BHU PMT (Mains)-2010
AIIMS-2000 / Manipal-2002

Ans. (a) : Yeast belongs to class Ascomycetes. It is a colourless, unicellular, non-mycelial plant.
It is also called as "Sugar fungus" because it converts sugars and starches into alcohol and carbon dioxide during the fermentation process.

671. Which of the following cause disease in human beings?
(a) Rhizopus (b) Puccinia
(c) Aspergillus (d) Cystopus
BVP-2005

Ans. (c) : Aspergillosis is an infection caused by *Aspergillus* (Black mould). It is usually found outdoors in dead leaves on plants. It can cause allergic reaction and in active disease that spreads to our brain, kidney lungs or asthma inhale their fungal spores.

672. Slimy mass of protoplasm with many nuclei and an amoeba-like thalloid body is a characteristic feature of
(a) Ascomycetes (b) Actinomycetes
(c) Phycomycetes (d) Basidiomycetes
(e) Myxomycetes
Kerala PMT-2009

Ans. (e) : Myxomycetes (slime mould) are multinucleated. amoeboidal & diploid. They are found in decaying leaves, in soil, and dark & cool conditions. They are saprophytic and lack chlorophyll. The plasmodial stage resembles protozoa, and fruiting bodies from spores resembling fungi.

673. Match the following and choose the correct combination from the options given

Column - I (Group)	Column - II (Example)
A. Eubacteria	1. Trichoderma
B. Dinoflagellates	2. Albugo
C. Phycomycetes	3. Gonyaulax
D. Deuteromycetes	4. Anabaena

(a) A -1, B - 2, C - A, D - 4
(b) A- 2, B - 3, C - 4, D - 1
(c) A- 4, B - 3, C - 2, D - 1
(d) A- 3, B - 4, C - 1, D - 2
(e) A- 4, B - 3, C - 1, D - 2
Kerala PMT-2012

Ans. (c) :

Column-I (Group)		Column-II (Example)
A. Eubacteria	–	(4) Anabaena
B. Dinoflagellates	–	(3) Gonyaulax
C. Phycomycetes	–	(2) Albugo
D. Deuteromycetes	–	(1) Trichoderma

674. Fungi can be stained with :
(a) Fast green (b) Cotton blue
(c) Grams stain (d) PAS
BVP-2000

Ans. (b) : Fungi can be stained with **cotton blue**, which provide blue colour of chitinous cell wall.
- **Fast green** is used as a quantitative stain for histones at alkaline pH after acid extraction at DNA. It is also used as a protein stain in electrophoresis.
- **Gram stain** is a staining method used to classify bacteria into Gram positive & Gram negative.
- **Periodic-acid schiff (PAS)** is a staining method used to detect polysaccharides such as glycogen and mucosubstance.

675. Penicillium belongs to
(a) Phycomycetes (b) Ascomycetes
(c) Basidiomycetes (d) none of the these
BVP-2000

Ans. (b) : *Penicillium* belongs to the class Ascomycetes (sac fungi). In Ascomycetes, the main reproduction type is conidia, which develops on the conidiophore in the form of chains.

676. Organism which can respire in absence of O_2 is:
(a) Chlorella (b) Solanum
(c) Saccharum (d) Saccharomyces
BVP-2000

Ans. (d) : Organism that can respire in absence of O_2 is *Saccharomyces*. This process called **fermentation or Anaerobic respiration**. *Saccharomyces* are facultative anaerobes. They make ATP in the presence or absence of O_2.

677. When a fungus completes its life cycle on two hosts, it is called
(a) heterothallic (b) monothallic
(c) heteroecious (d) autoecious.
AMU-1995
CMC Vellore-2008

Ans. (c) : When a fungus completes its life cycle on two hosts, it is called **heteroecious**. It requires two unrelated hosts to complete their life cycle. The primary host is the host in which the parasites spends its adult life.
Example : *Puccinia graminis* : the primary host is **barley** and **barberry** is the alternate host.

678. The fruiting body of *Aspergillus* or *Penicillium* is
(a) Hypanthodium (b) Peritheium
(c) Apothecium (d) Cleistotheciun
AIIMS-1998
JCECE-2006

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Ans. (d) : The fruiting body of *Aspergillus* or *Penicillium* is cleistothecium. It is closed spore-bearing structure of some fungi from which spores are released only by disintegration or decay.

- **Hypanthodium** is a special type of cymose inflorescence, eg:- Banyan *(Ficus bengalensis)*
- **Perithecium** is a fleshy and sessile fruiting body with wide opened saucer shaped or cup shaped fungi eg:- *Neurospora*.
- **Apothecium** is a spore bearing structure in many lichens and fungi consisiting of a discoid or cupped body bearing asci on the exposed flat or concave surface.

679. Which one of the following is wrong for fungi?

(a) They are eukaryotic
(b) All fungi possess a purely cellulosic cell wall
(c) They are heterotrophic.
(d) They are both unicellular and multicellular

NEET-2016 Phase-II

Ans. (b) : In fungi, the cell wall contains chitin or cellulose along with other polysaccharides, proteins and lipids. Therefore, all fungi do not have a purely cellulosic cell wall.

- Fungi are heterotrophic eukaryotic organisms with filamentous bodies called mycelium.

680. The imperfect fungi which are decomposers of litter and help in mineral cycling belong to :

(a) Ascomycetes (b) Deuteromycetes
(c) Basidiomycetes (d) Phycomycetes

AIPMT (Re-Exam)-2015

Ans. (b) : Deuteromycetes, also called **anamorphic fungi**, which are decomposers of litter and help in mineral cycling.

In this the true sexual state is uncommon or unknown.

Some member are saprophytes or parasites while a large number of them are decomposers of litter and help in mineral cycling.

eg. *Colletotrichum, Helminthosporium* etc.

Conidia stages are similar to those in the phylum Ascomycota, but those of some species show affinities to lower fungi and the phylum Basidiomycetes.

681. Choose the wrong statement

(a) Yeast is unicellular and useful in fermentation
(b) Penicillium is multicellular and produces antibiotics
(c) Neurospora is used in the study of biochemical genetics
(d) Morels and truffles are poisonous mushrooms

AIPMT (Re-Exam)-2015

Ans. (d) : Morels and truffles are ascomycetes and are edible mushrooms.

Ascomycetes in the largest phylum of the kingdom Fungi. It produces sexual, non-motile spores known as **ascospores**.

They are produced in a sac-like structures known as Ascus. Each ascus contain 4-8 ascospores.

They are commonly known as sac fungi.

682. Which one of the following fungi contains hallucinogens?

(a) Morchella esculenta (b) Amanita muscaria
(c) Neurospora sp. (d) Ustilago sp.

AIPMT-2014

Ans. (b) : ***Amanita muscaria*** is an attractive mushroom often appear in group, which belongs to class Basidiomycetes. It is also called **fly Agaric or fly Amanita,** is a hallucinogen and must be considered poisonous. Hallucinogen is the psychoactive agent that cause hallucination. It produces a toxic alkaloid, muscarine, which mimics the effects of acetylcholine. This leads to excitation of neurons bearing these receptors and hence hallucinations.

683. An eukaryote which causes disease comes under

(a) monerans (b) fungi
(c) virus (d) none of these

UP CPMT-2007

Ans. (b) : Fungi are members of the group of eukaryotic organisms. Most of the plant diseases are caused by fungi.

684. The black rust of wheat is a fungal disease caused by:

(a) Albugo candida
(b) Puccinia graminis tritici
(c) Melampsora lini
(d) Claviceps purpurea

AIPMT-1995

Ans. (b) : The black rust of wheat is a fungal disease caused by *Puccinia griminis tritici*. It is belongs to class Basidiomycetes. It is an internal obligate parasite. They cause dark patches in the leaves and stem. *Puccinia* requires a moist climate to grow.

685. Absorptive heterotrophic nutrition is exhibited by:

(a) algae (b) fungi
(c) bryophytes (d) pteridophytes

AIPMT-1990

Ans. (b) : Absorptive heterotrophic nutrition is exhibited by fungi. They may act as saprophyte and parasites. They obtain nutrition from the host by haustoria and exhibit the absorptive or holophytic type of nutrition.

686. Identify the fungus, which produces chlamydospores from dikaryotic mycelium

(a) Sphacelotheca sorghi
(b) Rhizopus stolonifer
(c) Pyricularia oryzae
(d) Colletotrichum falcatum

AP EAMCET-2008

Ans. (a) : *Sphacelotheca sorghi* is a plant pathogen that infects maize and sorghum. It is a dikaryotic fungi which reproduces vegetatively.

687. Yeast is not included in protozoans but in fungi because

(a) it has chlorophyll
(b) it shows saprotrophic mode of nutrition
(c) it has eukaryotic organization

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(d) cell wall is made up of cellulose and reserve food materials as starch.

AIIMS-2016

Ans. (b) : Yeast are microscopic fungi consisting of solitary cells that reproduce by budding whereas protozoans exhibit reproduction by gamete formation or by conjugation. Yeast is therefore, not included in protozoans but in fungi because it shows saprotrophic mode of nutrition.

688. Among rust, smut and mushroom all the three

(a) Are pathogens (b) Are saprobes
(c) Bear ascocarps (d) Bear basidiocarps

AIIMS-2006

Ans. (a) : The rust, smuts and mushrooms belong to Basidiomycetes. They belong to the group of pathogenic fungi. Smuts belongs to order Ustilaginales whereas rusts come under order Uredinales and mushrooms under order Agaricales.

689. Which one of the following shows heterothallism?

(a) Rhizopus (b) Bacterium
(c) Cycas (d) Ricinus

AIIMS-2014

Ans. (a) : A.F. Blackeslee discovered heterothallism in *Rhizopus stolonifer* in 1904. In this phenomenon, the fungi shows fusion of gametes which belong to morphologically, genetically and physiologically dissimilar mycelia normally referred to as negative or positive strains.

690. Branched, aseptate, coenocytic mycelium present in :

(a) Aspergillus (b) Albugo
(c) Penicillium (d) Erysiphe

Punjab MET-2006
Rajasthan PMT-2002
JCECE-2003

Ans. (b) : The branched, aseptate, coenocytic mycelium is present in *Albugo*. It is an obligate parasite that can be found in a number of flowering plants. The vegetative part of the plant body is branched, non-septate or aseptate and has coenocytic hyphae which grows in the intercellular spaces of the host.

691. Which of the following groups is not comprised of sac-fungi?

(a) Yeasts (b) Truffles
(c) Mushrooms (d) Morels

JCECE-2002

Ans. (c) : The mushrooms are edible fungus that belongs to the kingdom Fungi but is a species of Basidiomycota and not of Ascomycota. It is a fleshy and spore - bearing fruiting body. It is also known as **toadstool** and does not contain sac fungi.

692. The scientific name of oyster mushroom, an edible fungus is:

(a) Tolyposporium penicillariae
(b) Colletotrichum falcatum
(c) Pleurotus ostreatus
(d) Citromyces purpurogenum

JCECE-2002

Ans. (c) : The scientific name of oyster mushroom, an edible fungus is *Pleurotus ostreatus*. It is rich in proteins, nutrients, minerals, etc. It also has different cancer preventing agents like selenium which shield body cells from harm that may cause illness.

693. Yeast is different from *Penicillium* and *Rhizopus* in being:

(a) acellular (b) unicellular
(c) having unseptate hyphae (d) multicellular

JCECE-2002

Ans. (b) : Yeast is different from *Penicillium* and *Rhizopus* in being unicellular. The *Penicillium* and *Rhizopus* are multicellular fungi.

694. Dikaryon formation is characteristic feature of

(a) Zygomycetes and Phycomycetes
(b) Phycomycetes and Ascomycetes
(c) Basidiomycetes and Phycomycetes
(d) Basidiomycetes and Ascomycetes

BVP-2014
MGIMS Wardha-2006

Ans. (d) : The dikaryon formation is the characteristic feature of basidiomycetes and ascomycetes.
In case of ascomycetes and basidiomycetes, it is found that plasmogamy precedes karyogamy and resulting in formation of dikaryon, which is a unique condition in these fungi.

695. A fungal disease of the poultry is:

(a) Coccidiosis (b) Monilliasis
(c) Coryza (d) Mareks

AP EAMCET-1998

Ans. (b) : Monilliasis is a fungal disease of poultry. It is a disease of the alimentary tract of chickens and sometimes other birds. The cause is the fungal yeast known as *Candida albicans*, and the condition is seen worldwide. Mortality and morbidity is usually low. The route of this infection is normally oral.

696. One of the major components of cell wall of most fungi is

(a) Hemicelluloses (b) Chitin
(c) Peptidoglycan (d) Cellulose

NEET-2016 Phase-I

Ans. (b) : Major components of cell wall of most fungi is chitin. The fungal cells wall is predominantly composed of carbohydrates polymers called **chitin.** The other major constituents of the fungal cell wall are glucans and glycoproteins.

697. Identify the diseases that are caused by the organisms of the same subdivision of Eumycota.

I. Citrus canker
II. Red rot of sugarcane
III. Grain smut of Sorghum
IV. Black neck of rice
The correct pair is

(a) I and IV (b) I and III
(c) II and III (d) II and IV

AP EAMCET-2007

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Ans. (d) :

Disease	Causal Organism
Citrus Canker	*Xanthomonas citri* (bacteria)
Red rot of sugarcane	*Colletotrichum falcatum*
Grain smut of Sorghum	*Sphacelotheca sorghi*
Black neck of rice	*Pyricularia oryzae*

698. Study the following lists

List–I	List–II
(A) Sphaerotheca	**1. Three celled conidia**
(B) Colletotrichum	**2. Zoospores**
(C) Pyricularia	**3. Falcate conidia**
(D) Olpidium	**4. Suspensor**
	5. Columella

The correct match is

	A	B	C	D
(a)	4	2	5	3
(b)	3	4	2	5
(c)	5	3	1	2
(d)	2	1	3	4

AP EAMCET-2007

Ans. (c) :

List–I	List–II
(A) Sphaerotheca	Columella
(B) Colletotrichum	Falcate conidia
(C) Pyricularia	Three celled conidia
(D) Olpidium	Zoospores

699. The parthenospores of Rhizopus are

(a) Uninucleate (b) Binucleate
(c) Trinucleate (d) Multinucleate

AP EAMCET-2007

Ans. (d) : The parthenospores of *Rhizopus* are multinucleate because *Rhizopus* is a member of fungi and fungal body consists of a network of thread like structure called **hyphae**. It is made of continuous tubes filled with multinucleated cytoplasm these are called **coenocytic hyphae**.

700. Stored food in fungi:

(a) Starch (b) Proteins
(c) Glycogen (d) Chitin

AIPMT-2000

Ans. (c) : The glycogen is also known as **animal starch**, which is a form of stored food in fungi. The fungi get their nourishment from other sources as they are not capable of producing their food. They also have oil globules as reserved food material.

701. Black rust of wheat is caused by:

(a) Puccinia (b) Ustilago
(c) Albugo (d) Phytophthora

AIPMT-2000

Ans. (a) : Black stem rust is caused by *Puccinia graminis tritici.* It causes rust disease in many economic plants such as wheat, barley, oats, etc. It is called a **rust** because of the reddish brown color of the spores that are found chiefly upon the surface of the host leaves and stems.

702. *Monascus purpureus* is a yeast used commercially in the production of:

(a) Citric acid
(b) Blood cholesterol lowering statins
(c) Ethanol
(d) Streptokinase for removing clots from the blood vessels

AIPMT (Screening)-2012

Ans. (b) : *Monascus purpureus* is a yeast used commercially in the production of blood cholesterol lowering statins.

- *Monascus purpureus* is a species of mold that is purplish-red in color and known by the names such as, ang-khak rice mold, corn silage mold, maize silage mold and rice kernel discoloration.

703. Which one single organism or the pair of organisms is correctly assigned to its or their named taxonomic group?

(a) Yeast used in making bread and beer, is a fungus
(b) *Nostoc* and *Anabaena* are examples of Protista
(c) *Paramecium* and *Plasmodium* belong to the same kingdom as that of *Penicillium*
(d) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan

AIPMT (Screening)-2012

Ans. (a) : Yeast (*Saccharomyces cerevisiae*) is a fungi, which help in the production of bread and beer by the process of fermentation.
Yeast is a unicellular fungi of the class Ascomycota, they occur as single cell or as a group of chain of cells.

- *Paramecium* and *Plasmodium* are protista while *Penicillium* is a fungi.
- *Nostoc* and *Anabaena* are Monerans.

704. Yeast is used in the production of:

(a) Bread and beer
(b) Cheese and butter
(c) Citric acid and lactic acid
(d) Lipase and pectinase

AIPMT (Screening)-2012

Ans. (a) : Yeast is used in the production of bread and beer Microbes especially yeasts have been used from time immemorial for the production of beverages like wine, beer, whisky, brandy or rum. For this purpose the same yeast *Saccharomyces cerevisiae* used for bred-making and commonly called **brewer's yeast**, is used for fermenting malted cereals and fruit juices, to produce ethanol.

705. The highest number of species in the world is represented by:

(a) Algae (b) Lichens
(c) Fungi (d) Mosses

AIPMT (Screening)-2012

Ans. (c) : The highest number of species in the world is represented by fungi, around 1,00,000 species of fungi have been formally described by taxonomist. Fungi can be unicellular, multicellular or dimorphic. It also includes yeasts, rusts, slime molds, mild dews, and mushrooms.

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706. Which one of the following is true for fungi?
(a) They are phagotrophs
(b) They lack a rigid cell wall
(c) They are heterotrophs
(d) They lack nuclear membrane

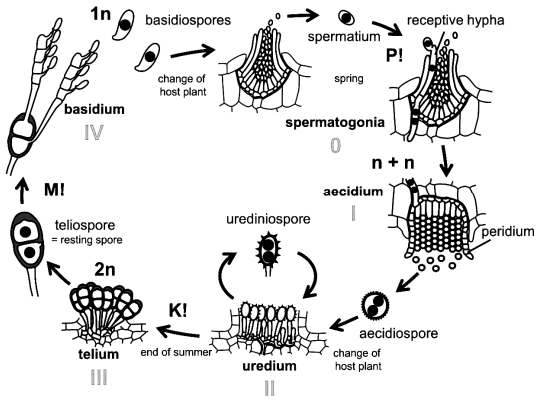
NEET (Karnataka)-2013

Ans. (c) : Fungi derive their nutrition from the other organisms which are living or dead. Therefore, fungi are heterotrophic in nature.

707. What is correct for stages of *Puccinia* :
(a) Telia and aecia on wheat
(b) Telia and uredo stage on wheat
(c) Telia and aecia on barberry
(d) None

AIPMT-1998

Ans. (b) : *Puccinia* is a heteroceous fungi it show obligate parasitism in wheat plant and are known as rusts. It causes black stem rust or cereal rust.
- The life cycle of fungus requires two hosts to complete its life cycle.
- The uredinia are present on the leaf sheaths as well as stems and leaves of the wheat plants.
- The fungus complete its life cycle in the two hosts, which are cereal plants and barberry.
- The important stages of the fungus in wheat are the telia and uredo stages.



708. *Saccharomyces cerevisiae* is used in the formation of
(a) Ethanol (b) Methanol
(c) Acetic acid (d) Antibiotics

MGIMS Wardha-2003
AIPMT-1998

Ans. (a) : *Saccharomyces cerevisiae* used for bread making and commonly called brewer's yeast. It is used for fermenting malted cereals and fruit juices to produce ethanol.

709. Which of the following yields citric acid :
(a) Penicillium citricum (b) Aspergillus niger
(c) Saccharomyces (d) Azospirilium

AIPMT-1998

Ans. (b) : *Aspergillus niger* a fungus which produce citric acid. It is a haploid filamentous fungus which is used for waste management and biotransformation in addition to its industrial uses.

710. Adhesive pad of fungi penetrate the host with the help of : -
(a) Mechanical pressure and enzymes
(b) Hooke and suckers
(c) Softening by enzymes
(d) Only by mechanical pressure

AIPMT-2001

Ans. (a) : Fungal pathogens use direct penetration of the plant surface to the host with the help of **mechanical pressure and enzyme** of natural opening or other. They have special enzymes to do this work.
• Fungi release cellulase to digest cellulose of the host cell wall so that the hypha is able to penetrate the host cell wall.

711. Which one of the following is wrongly matched?
(a) Cassia – Imbricate aestivation
(b) Root pressure-Guttation
(c) Puccinia – Smut
(d) Root – Exarch protoxylem

AIPMT (Screening)-2011

Ans. (c) : *Puccinia* is an obligate parasite, causes rust disease. Therefore, also known as **rust**.
- It is a heteroecious fungus (complete their life cycle in more than one host). The stem, cereal rusts are caused by these fungus.

712. Identify the correct sequence of the stages in the life cycle of Rhizopus after the reduction division of zygospore.
(a) Promycelium → germ sporangium → germ spores → mycelium
(b) Promycelium → germ spores → germ sporangium → mycelium
(c) Mycelium → promycelium → germ spores → germ sporangium
(d) Promycelium → mycelium → germ sporangium → zygospores

AP EAMCET-2010

Ans. (a) : *Rhizopus* is a genus under the phylum Zygomycota. Most of the *Rhizopus* species are heterothallic in nature. The life cycle is either haploid or haplontic. Therefore, on germination, the thick zygosporangium wall crack opens. The contents of zygospore remain surrounded by the endospore emerging a small upright hypha, the promycelium which bears the germ sporangium at its top. They produce either (+) or (–) strain germ spores or both which fall on suitable substratum to germinate and forms the mycelium.

713. Which option shows incorrectly matched group?
(a) Pseudopodiospores- Plasmodium - Sporulation
(b) Gemmules - Spongilla - Budding
(c) Zoospores - Aspergillus Sporulation
(d) Conidia - Penicillium - Asexual reproduction

GUJCET-2014

Ans. (c) : In *Aspergillus*, sporulation occurs in the form of condiospores that are developed from a stalk-like structure called the **condiophores**.

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714. Which of the following groups of organisms are ecologically similar?
(a) Producer protists and consumer protists
(b) Monerans and producer protists
(c) Consumer protists and fungi
(d) Monerans and fungi

AP EAMCET-2008

Ans. (d) : Monerans and Fungi are ecologically similar. Fungi are heterotrophic, spore-bearing achlorophyllous organism. Their cell wall is made up of a chitin. Fungi vary from single cell **(yeast)** to multicellular **(mushroom)** and bracket fungi, may be saprophytic or parasitic.

715. Which pair of the following belongs to Basidiomycetes ?
(a) Morchella and Mushrooms
(b) Birds' nest fungi and Puffballs
(c) Pufballs and Claviceps
(d) Peziza and Stink horns

AIPMT-2007

Ans. (b) : Basidiomycetes are fungi usually referred to as **club-fungi** because they have club-shaped Basidiospores which are sexual spores.
- Bird's nest fungi are known as *Cyathus* and Puffballs are known as *Lycoperdon*.
- They use meiospores to reproduce sexually.
- Basidia are used by the bird's nest fungus and puffballs to create spores. They belong to basidiomycetes.

716. 'Clamp connections' are observed in
(a) Basidiomycetes (b) Zygomycetes
(c) Ascomycetes (d) Oomycetes

JIPMER-2009

Ans. (a) : Clamp connections are observed, in Basidiomycetes (club fungi). During nuclear divisions of the dikaryotic cells special structures called the clamp connections are formed. They are the large group of kingdom Fungi that are filamentous and are composed of hyphae that reproduce asexually with the formation of specialized cells known as **basidia** that bear external meiospores that are usually four in number.

717. Edible part of mushroom is
(a) Basidiocarp (b) Secondary mycelium
(c) Primary mycelium (d) Tertiary mycelium

JIPMER-2009

Ans. (a) : A sporophore, or fruiting body in which spores are formed sexually on the surface of club shaped structure are called **basidiocarp**. It is a edible part of mushroom.
- Fruiting body of a basidiomycetes is called basidiocarp.

718. Parasitic and saprophytic conditions are more familiar in
(a) fungi (b) bacteria
(c) algae (d) ferns

UP CPMT-2005

Ans. (a) : Parasitic and saprophytic conditions are more familiar in fungi. They are hetrotrophic organisms which means that they cannot prepare their own food and therefore, they live as either parasites or saprophytes.

719. Identify from the following examples, a fungus which is medicinal importance.
(a) Agaricus (b) Saccharomyces
(c) Penicillium (d) Cercospora

Karnataka CET-2006

Ans. (c) : *Penicillium* is a fungus which have medicinal importance. Penicillin is extracted from *Penicillium notatum* which fights bacterial infection. It belongs to Ascomycetes.

720. Which one is a wrong statement?
(a) Brown algae have chlorophyll a and c and fucoxanthin
(b) Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms
(c) Mucor has biflagellate zoospores
(d) Haploid endosperm is typical feature of gymnosperms

AIPMT (Re-Exam)-2015

Ans. (c) :
- Mucor belongs to Zygomycetes, which produce non-motile, non-flagellated gametes.
- Zygomycetes are fungi belonging to the Eumycota, the true fungi that form extended mycelia and diverse asexual and sexual spore structure.
- Sexual reproduction in these organisms occurs when sexually opposite hyphae fuse and form spore called **zygospore.**
- The largest old zygomycetes is **mucorales**. Fungi in this order are known as **pink moulds,** which create black bread mould.

721. Powdery mildew of crops are caused by
(a) Bacteria (b) Ascomycetes
(c) Basidiomycetes (d) Phycomycetes

MGIMS Wardha-2010

Ans. (b) : Powdery mildew is the diseases resulting from infection by fungi that produce a white to gray, powdery growth on the surface of leaves and sometimes other plant parts.
It is caused by fungi belonging to family Erysiphaceae (class Ascomycetes).
Ascomycetes spores are harmful and it makes the crop vulnerable to its toxin.

722. LSD is obtained from :
(a) algae (b) virus
(c) fungus (d) bacteria

AFMC-2000

Ans. (c) : LSD (Lysergic acid diethylamide) is synthetically derived from the fungus, *Claviceps purpuria*. It is one of the most potent perception changing chemicals.

723. Fungal spores produced externally at the top of hyphae are:
(a) conidia (b) oidia
(c) aplanospore (d) sporangiopore

AFMC-2005

Ans. (a) : Fungal spore produced externally at the top of hyphae are conidia. They are asexual spore produced exogenously on the special mycelium called **conidiophores**. Conidia on germination produce mycelium.

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724. Morels and truffles groups of fungi are classified under
(a) Phycomycetes (b) Deuteromycetes
(c) Basidiomycetes (d) Ascomycetes
AMU-2015

Ans. (d) : Morels and truffles groups of fungi are classified under Ascomycetes. They are commonly know as **sac-fungi**, are mostly multicellular. They are saprophytic decomposers, parasitic or caprophilous.

725. Multinucleated filament of Rhizopus is :
(a) coenocytic (b) conidia
(c) heterothallus (d) homothallus
BCECE-2005

Ans. (a) : Multinucleated filament of *Rhizopus* is coenocytic. It is multinucleate mass of protoplasm resulting from repeated nuclear division unaccompanied by cell fission.

726. A septum in Eumycota fungi, bearing a complex pore is called as:
(a) coenocytic (b) septate hyphae
(c) dolipore septum
(d) secondary simple pore
BHU PMT-2002

Ans. (c) : A septum in eumycota fungi, bearing a complex pore is called as **dolipore septum**.
Dolipore septa are specialized dividing walls between cells (septa) found in almost all species of fungi in the phylum Basidiomycota.

727. Which of the following shows formation of pseudo mycelium?
(a) Yeast (b) Aspergillus
(c) Rhizophora (d) Chara
BHU PMT-2002

Ans. (a) : Yeast shows formation of pseudo mycelium. Here, the cells join together like chain resembling a small true mycelia.

728. The basic unit of chitin is :
(a) N-acetyl glucosamine (b) glucose
(c) galactose (d) fructose
Punjab MET-2003

Ans. (a) : The basic unit of chitin is N-acetyl glucosamine which is a modified polysaccharide that contains nitrogen. It is also found in the cell walls of certain fungi and algae. The main function of chitin is to provide protection and strength to fragile bodies of these organism.

729. In which genera endospores are formed for reproduction ?
(a) Monococcus and Clostridium
(b) Bacillus and Clostridium
(c) Mucor and Bacillus
(d) None of the above
Punjab MET-2003

Ans. (b) : The endospore formation is more common in rod-shaped bacteria or bacillus forms. They are dormant alternate life forms produced by the genus *Bacillus*, the genus *Clostridium*.

730. Aflatoxins are mainly produced by:
(a) Algae (b) Fungi
(c) Bryophyta (d) Pteridophyta
Rajasthan PMT-1996

Ans. (b) : Aflatoxins are family of toxins produced by certain fungi that are found on agricultural crops like maize. The main fungi that produce aflatoxin is *Aspergillus flavvus*. It can lead to acute poisoning (aflatoxicosis) and can be life threatening usually through damage to the liver.

731. Flagella present in Zoospores of Albugo are:
(a) Two dissimilar, on lateral surface
(b) Two similar, on lateral surface
(c) Two similar, on anterior tip
(d) Two dissimilar, on anterior tip
Rajasthan PMT-1996

Ans. (a) : The flagella present in Zoospores of Albugo are two dissimilar, on lateral surface. The diploid nucleus undergoes meiosis, followed by several mitotic division in *Albugo*. After a period of rest, the zoospore germinates and produce reniform, biflagellate zoospores.

732. Water is not necessary for fertilization in which of the following?
(a) Pteridium (b) Spirogyra
(c) Marchantia (d) Albugo
Rajasthan PMT-1996

Ans. (d) : In Pteridium, Spirogyra and Marchantia, water is necessary for fertilization. But, in Albugo water is not necessary because they are terrestrial.

733. Match column I and column II and choose the right option.

Column I	Column II
A. Rhizopus	1. Ascomycetes
B. Penicillium	2. Basidiomycetes
C. Ustilago	3. Deuteromycetes
D. Alternaria	4. Phycomycetes

(a) A-4 B-3 C-1 D-2 (b) A-4 B-3 C-2 D-1
(c) A-4 B-1 C-2 D-3 (d) A-2 B-3 C-4 D-1
VMMC-2013

Ans. (c) :
(A) Rhizopus → (4) Phycomycetes
(B) Penicillium → (1) Ascomycetes
(C) Ustilago → (2) Basidiomycetes
(D) Alternaria → (3) Deuteromycetes

734. Which of the following produces spores, but lacks vasculature?
(a) Fungi (b) Dicots
(c) Pteridophytes (d) Gymnosperms
VMMC-2013

Ans. (a) : Fungi produces spores but lacks vascular system. It is a part of plant which is meant for supplying water and nutrient to the plants.

735. Fermentation products of yeast are
(a) $H_2O + CO_2$
(b) Methyl alcohol + CO_2
(c) Methyl alcohol + Water
(d) Ethyl alcohol + CO_2
MGIMS Wardha-2007

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Ans. (d) : In alcoholic fermentation process, the unicellular organisms like yeast undergo an alternate pathway of respiration in which an organic substrate is broken down in absence of oxygen. The end products are ethyl alcohol and CO_2.

$C_6H_{12}O_6$ (aq) $\xrightarrow{\text{Yeast}}$ $2C_2H_5OH + 2CO_2$ + energy

It is used in fermentation because it contains enzyme like zymase that can metabolize the carbohydrate without oxygen.

736. Sexual dimorphism is absent in

(a) Ascomycetes (b) Deuteromycetes
(c) Basidiomycetes (d) Phycomycetes

Manipal-2012

Ans. (b) : Sexual dimorphism is absent in deuteromycetes. It refers to the morphological differences between males and females of the same species aside from the differences in sexual organs.

737. Gill of mushroom are meant for

(a) reproduction (b) respiration
(c) assimilation (d) nutrition

Manipal-2011

Ans. (a) : The gills of mushrooms are meant for reproduction. They are also known as the **lamella of the mushroom.**

They hang vertically beneath its cover which permits the spores to fall and drop on the ground and are dispersed by wind flows.

738. Mycobiont and phycobiont association is :

(a) symbiotic (b) commensalism
(c) parasitic (d) helotism

AFMC -2011

Ans. (d) : Helotism is a term used to describe the lichen symbiosis between algae and fungi.

The fungal component of lichen that protect algae and absorbs minerals are **mycobiont** whereas the **phycobiont** is a algal component of lichen that prepares the food for fungi.

739. The total number of ascospores in Penicillium are

(a) 8 (b) 16
(c) 4 (d) 2

VMMC - 2014
AFMC -2011

Ans. (a) : The diverse genus occuring worldwide and its species play important role an decomposers of organic materials is *Penicillium*. It belongs to Ascomycetes which produces spores in asci called **ascospores**. Single diploid ascus undergoes meiotic division and produces four haploid nuclei. These new nuclei undergo further mitotic division and produce four pairs of spores or 8 ascospores.

740. Laboratory weed is

(a) Neurospora (b) Chlamydomonas
(c) Aspergillus (d) Chara

BHU PMT (Mains)-2011

Ans. (c) : *Aspergillus* is regarded as **weed of laboratory** because it can grow in unwanted places contaminating bacteriological samples.

741. Heterothallism is common in :

(a) Mucor (b) Yeast
(c) Spirogyra (d) Ulothrix

BHU PMT-2001

Ans. (a) : The fusion of externally similar but physiologically different aplano-gametangia during sexual reproduction is called as **heterothallism**, discovered in **Rhizopus stolonifer** by Blackeslee. It is commonly found in *Mucor* and *Rhizopus.*

742. Club fungi is included in :

(a) Phycomycetes (b) Ascomycetes
(c) Basidiomycetes (d) Deuteromycetes

BHU PMT-2001

Ans. (c) : Club fungi is included in Basidiomycetes. It includes mushroom, puffballs and certain shelf fungi etc. They are known as **club -fungi**, due to their club-shaped basidia, which produces sexual spores.

743. Trichoderma species are potentially useful as

(a) biopesticides
(b) biofertilizers
(c) methanogens
(d) vectors for genetic engineering

DUMET-2010

Ans. (a) : *Trichoderma* species are potentially useful as biopesticides for it's well known biological control mechanism, it protects crops against plant pathogens. It is used to treat seeds and soils to eliminate pathogens.

744. Fungi differs from slime moulds by lacking of

(a) flagellated spores (b) ascospores
(c) basidiospores (d) zygospores

DUMET-2008

Ans. (a) : Fungi differs from slime moulds by lacking of flagellated spores. They do not possess a cell wall whereas fungal cell wall is composed of chitin and beta-glucan.

745. In Rhizopus, the fusion of two different thalli to form zygospore is called:

(a) spermaciation
(b) gametangial contact
(c) gametangial copulation
(d) both (a) and (b)

AFMC-2002

Ans. (c) : In *Rhizopus*, the fusion of two different thalli (hyphae) to form a zygospore is called plasmogamy or gametangial copulation. It undergoes sexual reproduction through the formation of specialized structures called gametangia.

746. Which of the following is an edible fungus?

(a) Neurospora (b) Penicillium
(c) Agaricus (d) Rhizopus

BHU PMT (Mains)-2008
JIPMER-2003, 2000, 1997

Ans. (c) : *Agaricus* is an edible fungus. These fungi are commonly known as **mushrooms**. They are common edible mushrooms, commercially cultivated in various parts of India. It is a saprophytic fungus which occurs on dead decaying leaves, wood logs, in rainy season.

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747. Which one of the following is used extensively in biochemical and genetic work?
(a) Saccharomyces (b) Aspergillus
(c) Claviceps (d) Penicillium
(e) Neurospora

Kerala PMT-2015

Ans. (e) : *Neurospora*, has been used extensively in genetic and biochemical investigation. It is widely used in genetics as a model organism because it has the ability to quickly divide, easy to culture and survive on minimal media.

748. Match Column I with Column II and choose the right option

	Column-I		Column-II
(p)	Claviceps	(1)	Deuteromycetes
(q)	Puccinia	(2)	Ascomycetes
(r)	Trichoderma	(3)	Basidiomycetes

(a) (p) - (3), (q) - (1), (r) - (2)
(b) (p) - (2), (q) -(3), (r) - (1)
(c) (p) - (1), (q) - (3), (r) - (2)
(d) (p) - (3), (q) - (2), (r) - (1)
(e) (p) - (2), (q) - (1), (r) - (3)

Kerala PMT-2015

Ans. (b) :
(p) Claviceps → (2) Ascomycetes.
(q) Puccinia → (3) Basidiomycetes.
(r) Trichoderma → (1) Deuteromycetes.

749. Diplanetism is exhibited by
(a) Saprolegnia (b) Rhizopus and Mucor
(c) Ulothrix (d) Vauchena

AMU-2011

Ans. (a) : Diplanetism is exhibited by *Saprolegnia*. It is a phenomenon, having two mobile stages with a pauses between them. For instance, zoospores are released by *Saprolegnia* that forms a cyst right away, which will germinate to release its secondary zoospore later.

750. Heterotrophic fungi can live as
(a) saprophytes (b) symbionts
(c) parasites (d) All of these

AMU-2010

Ans. (d) : In fungi, mode of nutrition is heterotrophic therefore, they are parasitic, saprophytic and symbiotic. Those fungi which grow on dead organic matter are called **saprophytic fungi** whereas those who obtain their food from living hosts are called **parasitic fungi**, and those who live in symbiotic association with algae and form lichen thalli are **symbiotic fungi**.

751. Which organism was used by Beadle and Tatum to proposed one gene-one enzyme hypothesis?
(a) E. coli (b) Nostoc
(c) Drosophila (d) Neurospora

MGIMS Wardha-2004
UP CPMT-2004

Ans. (d) : Beadle and Tatum used *Neurospora* to propose one gene-one enzyme hypothesis. It is the idea that each gene encodes a single enzyme.

752. In the sporogonium of which plant, columella is present?
(a) Penicillium (b) Spirogyra
(c) Rhizopus (d) Ulothrix

MGIMS Wardha-2004
UP CPMT-2004

Ans. (c) : The columella is a specialized structure found in the sporangium of *Rhizopus*. The columella supports the sporangium which has asexual spores and helps nutrient exchange between the active protoplasm below and the developing spores.

753. The chemical produced by the host plant to protect themselves against fungal infection is :
(a) toxin (b) phytoalexin
(c) phytotoxin (d) hormone

Manipal-2000

Ans. (b) : The chemical produced by the host plant to protect themselves against fungal infection is **phytoalexins**. The chemical substances produced by plants in response to fungal infection and are toxic to fungi are phytoalexins. They are antibiotics produced by a plant in response to environmental stresses.

754. Basidiospores are produced by:
(a) Yeasts (b) Diatoms
(c) Agaricus (d) Bacteria

Karnataka CET-2003

Ans. (c) : Basidiospores are produced by *Agaricus*. It is a reproductive spore produced by Basidiomycete fungi. Each basidiospores contains are haploid nucleus through meiosis. They are produced on specialized club shaped cells named basidia.

755. Branched conidiophores are present in:
(a) Rhizopus (b) Penicillium
(c) Ustilago (d) Aspergillus

Uttarakhand-2005

Ans. (b) : Branched conidiophores are present in *Penicillium*. These are specialized branches of hyphae that bear the conidia. They species are often recognized by the branching patterns of conidiophores. These are not found in *Rhizopus, Ustilago* and *Aspergillus*.

756. A pathogen accumulates its secretion in the xylem vessels of a plant, whose seed epidermal hairs are of great economic importance. Identify the pathogen.
(a) Fusarium oxysporum (b) Xanthomonas citri
(c) Phytophthora infestans (d) Puccinia purpurea

AP EAMCET-2003

Ans. (a) : A *Fusarium oxysporum,* pathogen accumulates its secretion in the xylem vessels of a plant, whose seed epidermal hairs are of great economic importance. It causes fusarium wilt and infects Solanaceous crops and weeds.

757. Which of the following statements is correct with respect to *Agaricus bisporus*?
(a) It contains toxins hence not suitable for consumption
(b) It does not contain essential amino acids
(c) It is a good source of B-Vitamins
(d) Its cultivation on agro wastes is impossible

AP EAMCET-2004

Ans. (c) : *Agaricus bisporus* is a fungus which is commonly known as **mushroom**. They are edible fungi and are commercially cultivated and exported.
- They contains vitamin B, amino acids, and minerals.
- They are one of the richest source of proteins.

758. Which of the following statements is correct with respect to *Colletotrichum falcatum*?
(a) The conidia and conidiophores are aseptate mycelium and setae are septate

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(b) The conidia, conidiophores, mycelium and setae are septate
(c) The conidia are aseptate conidiophores, mycelium and setae are septate
(d) The mycelium is septate conidia, conidiophores and setae are aseptate

AP EAMCET-2004

Ans. (a) : The conidia and conidiophores are aseptate while mycelium and setae are septate structure in *Colletotrichum falcatum*. They reproduce asexually through conidia and these are formed on conidiophore.

759. In Rhizopus, dome shaped sterile portions are found on erect structures that arise from stolons. These structures are referred to as:
(a) gametangia (b) progametangia
(c) zygosporangia (d) sporangiophores

AP EAMCET-2004

Ans. (d) : In Rhizopus, dome shaped sterile portions are found on erect structures that arise from stolons. These structures are referred to as sporangiophores.
The sporangia are black colored at the tips of the sporangiophores and are round. It produce numerous spores for asexual reproduction which are non-motile and multinucleated.

760. Name the fungus that is edible
(a) Penicillium (b) Mucor
(c) Rhizopus (d) Morchella

Haryana PMT-2009 CG PMT-2009 MGIMS Wardha-2009 Haryana PMT-2009

Ans. (d) : *Morchella esculenta* is an edible fungus that belongs to the family Morchellaceae of the Ascomycota. They are commonly known as morel, sponge morel, etc.

761. Early blight disease of potato is caused by
(a) Phytopthora infestans (b) Fusarium
(c) Alternaria solani (d) Pythium

VMMC-2014

Ans. (c) : Early blight of potato is caused by the fungal pathogen *Alternaria solani*. There is no known sexual stage and hence it is classified as a Deuteromycetes. The symptoms of early blight occur on fruit, stem, foliage and tubers of potatoes.

762. In Puccinia, infection from barberry leaf to wheat plant is caused by :
(a) pycnospores (b) aeciospores
(c) uredospores (d) teleutospores

JIPMER-2001

Ans. (b) : *Puccinia* is a fungus belonging to the class Basidiomycetes. On the leaf of barberry plant, basidiospores germinates forming germ tube and grows extensively forming haploid, septate, uninucleate mycelium. Hence, *Puccina* infection from barberry to wheat occurs through Aeciospores.

763. A species of Neurospora which can grow on a simple minimal medium is known as:
(a) autotroph (b) heterotroph
(c) prototroph (d) auxotroph

JIPMER-1995

Ans. (c) : A species of *Neurospora* which can grow on a simple minimal medium is known as **prototroph**.

764. Promycelium in Rhizopus develops from
(a) zygophore (b) chlamydospore
(c) zygospore (d) sporangiospore

AP EAMCET-2001

Ans. (c) : Promycelium in *Rhizopus* develops from zygospore. They are essentially found in the member of kingdom Fungi. In *Rhizopus*, the male (+) and female (-) gametangia undergo fusion. Zygospores are sexual spores whereas zoospores are asexually produced.

765. Common bread mould is
(a) yeast (b) Rhizopus
(c) bacteria (d) virus

CG PMT-2006

Ans. (b) : Common bread mould is *Rhizopus*. It is commonly known as **black bread mould**. It is a saprophytic fungus which is frequently observed growing on bread. It survives as a mass of mycelium which is a part of the vegetative filament portion of the organism.

766. What are the successive structures formed in course of sexual reproduction of Rhizopus?
(a) Zygospore, progametangium, gametangium, zygophore
(b) Progametangium, zygophore, gametangium, zygospore
(c) Progametangium, gametangium, zygospore, zygophore
(d) Zygophore, progametangium, gametangium, zygospore

VMMC-2010

Ans. (d) : Zygophore– It is a specialized hyphal branch giving rise to another that forms the gamete in some molds.
Progametangium– It is a hyphal thread in fungi at whose tip it will produce a gametangium and then a gamete.
Zygospore– It is a thick walled spore of some algae and fungi that is formed by union of two similar sexual cells, i.e. resting spore and produces the sporophytic phase.

767. Fungi considered as plant because of presence of
(a) chlorophyll (b) nucleus
(c) cell wall (d) sexual reproduction

VMMC-2010

Ans. (c) : Fungi is considered as plant because of presence of cell wall. The fungal cell wall is formed of cellulose or chitin. Chitin is basically made up of N-acetyle glucosamine.

768. When the mycelium of *Rhizopus oryzae* grows submerged in a nutritive medium such as sugar solution the young coenocytic hyphae develop septa and divide into short multinucleate segment known as
(a) oidia (b) endospores
(c) exospores (d) conidia

CMC Vellore-2007

Ans. (a) : When the mycelium of *Rhizopus oryzae* grows submerged in a nutritive medium such as sugar solution the young coenocytic hyphae develop septa and divide into short multinucleate segment which is known as **oidia**.

769. Yeast is a good source of
(a) protein
(b) riboflavin (vitamin -B_2)

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(c) sugar
(d) ascorbic acid (vitamin -C)

CG PMT-2011

Ans. (b) : Yeast is important source of vitamin B, which is also known as **riboflavin**. It helps in body growth and makes the body stronger from inside, and is also important for the digestive functioning of the body.

770. Species belonging to this genus cause "downy mildew disease" :
(a) Uromyces (b) Fusarium
(c) Ustilago (d) Peronospora

AP EAMCET-2000

Ans. (d) : *Peronospora* is a genus of oomycetes that are obligate plant pathogen of many eudicots. This species causes downy mildew disease.

771. Vascular wilts are caused by this pathogen:
(a) Pyricularia (b) Puccinia
(c) Erwinia (d) Helminthosporium

AP EAMCET-2000

Ans. (c) : Vascular wilts are caused by the pathogen *Erwinia*. It is a pathogenic plant species and it causes bacterial wilt disease, which is a vascular tissue disease, which causes mechanical blockage of water transport system.

772. Which fungus causes black coal like spots of Anthracnose in plants:
(a) Gloeosporium (b) Tolyposporium
(c) Ustilago (d) Alternaria

AP EAMCET-2000

Ans. (a) : *Gloeosporium* fungus causes black coal - like spots of Anthrancnose in plants. Anthracnose causes the wilting, withering, and dying of tissues. It generally destroys the developing shoots and leaves.
Gloeosporium is also known as **Colletotrichum** which characteristically produces spores.

773. Powdery mildew of wheat is caused by a species of
(a) Puccinia (b) Erysiphe
(c) Ustilago (d) Albugo

Rajasthan PMT-2011

Ans. (b) : Powdery mildew of wheat is caused by a species of *Erysiphe* which is an obligate, host-specific fungus. It attacks wheat exclusively. They usually start off as circular powdery whit spots, which can appear on leaves, stem and also sometimes on fruits.

774. Which acid is not produced by various species of fungi?
(a) Gluconic acid (b) Acetic acid
(c) Sulphuric acid (d) Succinic acid

HP CET-2013
VMMC-2003

Ans. (c) : Sulphuric acid (H_2SO_4) is not produced by various species of fungi.

775. Fungal flagellum originates from
(a) dictyosomes (b) kinetosomes
(c) glyoxysomes (d) oxysomes

Manipal-2010

Ans. (b) : Fungal flagellum originates from kinetosomes. It is a structure in some flagellate protozoans which forms the base of the flagellum, consisting of a circular arrangement of microtubules.

776. Which organism forms perithecia in its life cycle?
(a) Colletotrichum (b) Pyricularia
(c) Helminthosporium (d) Sphaerotheca

Manipal-2010

Ans. (a) : Perithecium is common in class Ascomycetes. It is flask - shaped and has a definite apical pore, ostiole through which the ascospore escape. Here, sexual reproduction is absent.

777. Zygospore formation occurs in
(a) Mucor (b) Plasmodium
(c) Lentinum (d) Peziza

Manipal-2010

Ans. (a) : Zygospore formation occurs in *Mucor*, which is a type of sexual reproduction. Here, the tips of two multinucleate gametangia become fused and the protoplasm of both gametagia unit to form a zygospore.

778. Bakanae disease is caused by
(a) fungus (b) algae
(c) bacterium (d) virus

BHU-PMT (Screening)-2008

Ans. (a) : Bakanae disease is caused by a fungus *Gibberella fujikuroi*.
It is also called as **foolish seedling disease**. It affects the rice plants through the root. The affected seedling show abnormal elongation.

779. Fruiting body of mushrooms is present in :
(a) fungi
(b) algae
(c) like monocotyledon seeds
(d) like dicotyledon seeds

BCECE-2004

Ans. (a) : Mushrooms are edible fungus. They are spore-bearing, fleshy, fruiting body of a fungus. They are formed from hyphae, the tiny threads that make up the bulk of most fungi.

780. Mycology is related with:
(a) algae (b) fungi
(c) bacteria (d) yeast

BCECE-2004

Ans. (b) : Mycology is the branch of biological science dealing with the study of fungi, whereas the study of algae is known as **phycology**, and the study of bacteria is known as **bacteriology**.

781. This fungus is not edible
(a) Agaricus (b) Toadstool
(c) Puffballs (d) Morchella

BCECE-2009

Ans. (b) : Toadstool or mushroom is the fleshy, spore - bearing fruiting body of a fungus, typically produced above ground on soil, or its food source. It is poisonous to human.

E. Plantae

782. Yeast poison themselves to death, because
(a) Above 13% of alcohol is hazardous.
(b) Above 13% of lactic acid is hazardous
(c) Above 13% of pyruvic acid is hazardous.
(d) Low energy produced cannot support their growth.

AP EAPCET-23.05.2023, Shift-II

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Ans. (a) : When the concentration of alcohol reaches about 13 percent than yeasts poison themselves to death. Therefore, wine and beer which is undistilled alcoholic beverages do not show alcohol percentage above 13%.
In absence of oxygen, yeast converts sugar into alcohol and CO_2, when the level of alcohol increases to 13% then yeast's death takes place.

783. Match the following:

List-I		List-II	
I)	Makoi	A)	Dracaena augustifolia
II)	Red dragon	B)	Smilax zeylanica
III)	Sarasaparilla	C)	Cestrum nocturnum
IV)	Night queen	D)	Solamum nigrum

	I	**II**	**III**	**IV**
(a)	C,	A,	D,	B
(b)	B,	D	A	C
(c)	C,	D,	A,	B
(d)	D,	A,	B,	C

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : (I)Makoi or Black nightshade- The botanical name of Makoi is *Solanum nigrum* usually grows as a used in moist habitats. It belongs to Solanaceae family.
(II) Red drageon - The botanical name of dragon tree are *Dracaena aungustifolia* It is narrow-leaf Dragon Tree which is an evergreen shrubby plant.
(III) Sarsaparilla- The botanical name of sarsaparilla is Smilax species.
(IV) Night queen - *Cestrum nocturnum* is the botanical name of Night queen.
It belongs to Solanaceae family.

784. Match the following:

List-I		List-II		List-III	
a)	Witches Broom	I)	Trypanosome	i)	Prokaryote
b)	Sleeping Sickness	II)	Sheep	ii)	Fungi
c)	Early blight	III)	Mycoplasma	iii)	Protozoa
d)	Scrapie	IV)	Alternaria	iv)	Virus

	A	**B**	**C**	**D**
(a)	II i,	I iii,	IV iv,	III ii
(b)	IV i,	III ii,	I iii,	II iv
(c)	III i,	I iii,	IV ii,	II iv
(d)	II i,	III ii,	I iii,	IV iv

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : (a) Witches Broom– It is a type of disease caused by stress or Mycoplasma. It is prokaryotic organism. Many mycoplasma are pathogenic in animals and plants.
(b) Sleeping Sickness– It is a wakefulness distrubances diseases also called as African Trypanosomiansis which is caused by protozoans of the genus Trypanosoma.
(c) Early Blight– It is a type of disease which infects the potato, tomato and other plants. Early blight of potato is caused by the fungus *Alternaria solani*.
(d) Scrapie– Scrapie is a neurodegenerative disease, caused by a prion (Virus) that affects shepp and less frequently goats.

785. A person suffering from Iodine deficiency may be recommended to take extracts of this plant preparation
(a) Sargassum (b) Porphyra
(c) Chlorella (d) Laminaria

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : Laminaria is a brown seaweed algae. It contains iodine, an element that the body needs to make thyroid hormones.
The chief extracts from Laminaria are algin, iodine and mannitol, products widely used in medicals, food manufacturing industries etc.

786. Hashish, Charas and Ganja are
(a) Cannabinoids (b) Coca alkaloids
(c) Barbiturates (d) Opioids

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : Hashish, Charas and Ganja are obtained from a *Cannabis sativa* plant which belongs to family cannabaceae.
The flower contain a chemical compound known as Cannabinoids that are consumed for recreational, medicinal and spiritual purposes.

787. Identify the plants in the order of Ephemeral, Succulent and Non-succulent type
(a) Tribulus, Solanum, Casuarina
(b) Casuarina, Tribulus, Opuntia
(c) Aloe, Casuarina, Tribulus
(d) Tribulus, Aloe, Casuarina

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : Tribulus– Plants which are growing in water scarce environment called xerophytic plants and are found in dry habitats.
Ephemerals are draught escapers. During the short span of rains these plants live for a brief period. Ex.- Tribulus, Euphorbia.
Aloe– Aloe vera are the succulent type of plants.
Succulents are thickened, fleshy and engorged plant which allowing the plant to retain water in arid areas.
Casuarina– It is woody, angiosperm evergreen trees. Casuarina is commonly known as coastal she-oak or horsetail she-oak.

788. Choose the set of wrong combinations

I	Acacia	Phyllode	Petiole
II	Nepenthes	Insectivorous plant	Nitrogen requirement
III	Hibiscus	Two leaves at each nodes	Alternate
IV	Neem	Number of leaflets attached at common point	Pinnately compound

(a) A C (b) C D
(c) B D (d) A D

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : In Hibiscus, only one leaf is originated from a single node at every branch and the arrangement of leaves are in alternate manner.
In Neem, the number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf called pinnately compound leaf in which number of leaflets attached at common point.

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789. The correct combinations among the following

I	Artificial gene synthesis	H.G. Khorana	Cell Biology
II	Pollen Science	P.K.K. Nair	Polynology
III	Respiration	Arnon	Physiology
IV	Phylogenetic classification	Bessey	Taxonomy

(a) I III IV
(b) I II III
(c) II III IV
(d) I II IV

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Taxonomy, the science of classifing organisms, is based on phylogeny.

- Phylogenetic system of classification is based on evolutionary relationship of entities.
  The main features of Bessey's classification are- seed plants were consists of three phyla and are polyphyletic in origin.
- 'Hargovind Khorana' was awarded Nobel prize for the synthesis of an artificial gene is 1968. H.G. Khorana made important contributions to cell biology by building different RNA chains with the help of enzymes.
- P.K.K. Nair is known as the father of Indian 'palynology'. Palynology is the study of plant pollen, spores and certain microscopic plankton organisms in both living and fossil form.

790. The following plant is submerged and suspended in water

(a) Salvinia (b) Utricularia
(c) Nymphaea (d) Vallisneria

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : 'Utricularia' plant is submerged and suspended in water. Submerged hydrophytes are those plants that have their roots anchored at the bottom of the lake or pond. Some examples are Hydrilla, ceratophyllum and utricularia. Aquatic utricularia are often split into two categories : suspended and affixed aquatic.

791. The following plant has lateral branches of one internodal length

(a) Nerium (b) Oxalis
(c) Eichhornia (d) Dioscorea

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : Aquatic plants such as *Pistia* and *Eichhnornia* have a lateral branch with short internodes and each node with a rosette of leaves and a tuft of roots.

792. Which of the following plants are called as petro-plants?

(a) Jatropa and Banana
(b) Banana and Arnica
(c) Jatropa and Pongamia
(d) Pongamia and Banana

TS EAMCET-31.07.2022 Shift-II

Ans. (c) : The plants which provide liquid hydrocarbons as a substitute of liquid fuels are **petroplants**. The hydrocarbons present in these plants can be converted to petroleum hydrocarbons. The oil crisis during World war II had led the Italians and the French to switch over to petroplants for petroleum production.
Example- Jatropa and Pongamia.

793. Plant in which floral buds store food material

(a) Asparagus (b) Agave
(c) Dioscorea (d) Onion

AP EAPCET-12.07.2022 Shift-I

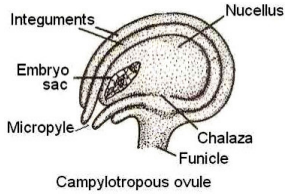
Ans. (b) : In Agave, floral buds store food materials. ***Agava americana*** also called century plant because it took 100 year for the plant to flower and it usually blooms after 10 to 25 years, dying after blooming.

794. The Campylotropous ovule is characterized by–

(a) Chalaza and Funicle on the same vertical line
(b) Micropyle lies close to funiculus
(c) Micropyle comes towards funiculus
(d) Completely inverted

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : Campylotropous Ovule– It is the type of ovule in which the body of the ovule is curved or bent such that micropyle and chalaza do not lie in the same line.



Campylotropous ovule

795. Green plants are:

(a) autotrophs (b) heterotrophs
(c) chemotrophs (d) none of these

BVP-2000

Ans. (a) : An organism that can produce its own food using light, water, carbon dioxide, or other chemicals are called **autotroph.** Because autotroph produce their own food, they are sometimes called **producers**. So green plant are autotrophs.

796. Sex chromosomes for the first time was discovered in which plant?

(a) *Sphaerocarpus* (b) *Pisum sativum*
(c) *Neurospora* (d) *Lathyrus odoratus*

DUMET-2006

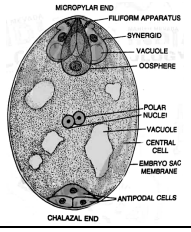
Ans. (a) : Sex chromosomes in plants were first reported in 1917 in the liverwort, *Sphaerocarpus*. Most flowering plants are monoecious and therefore, do not have sex chromosomes It has been reported in two plant species namely *Melandrium (Lychnis)* and *Sphaerocarpus.*

797. Polygonum type of embryo sac is:

(a) Monosporic octa (8) nucleate
(b) Monosporic tetra (4) nucleate
(c) Bisporic octa (8) nucleate
(d) Bisporic tetra (4) nucleate

MP PMT-2013

Ans. (a) : A Polygonum embryo sac is a monosporic embryo sac with 8 nuclei. About 130 species of flowering plants in the buckwheat and knotweed family Polygonaceae.



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798. Insectivorous plant is

(a) Cuscuta (b) Drosera
(c) Striga (d) None of the above

MGIMS Wardha-2012

Ans. (b) : Insectivorous plants mainly grow in humid and bogs where plenty of sunlight and moisture can be found. However, nutrients are scarce in the soil, they capture insects to supplement the nutrients that they tend to lack.
Example : - Drosera, Pitcher plant, Venus flytrap, Cobra lily.

799. Which of the weed is most harmful?

(a) Azolla (b) Parthenium
(c) Salvinia (d) Salicornia

CMC Vellore-2011

Ans. (b) : Parthenium is the most harmful weed, which belongs to family Asteraceae. It is commonly called as **congress grass, Santa Maria** etc, which is native to American tropics and is invasive species in India, Australia, etc.

800. The movement of hairs in Drosera is

(a) thermonastic (b) thigmonastic
(c) seismonastic (d) photonastic

UP CPMT-2011

Ans. (b): The movements of hair in *Drosera* is thigmonastic. It is the nastic (non-directional) response of a plant or fungus to touch or vibration. It is also known as **seismonasty**.

801. Which of the following plant cells is not surrounded by a cell wall?

(a) Root hair cell (b) Stem hair cell
(c) Gamete cell (d) Bacterial cell

JIPMER-2012

Ans. (c) : Gamete cell is not surrounded by a cell wall. It is a sex cells of the flowering plants. It is haploid in nature. On the other hand, root hair cell, stem hair cell and bacterial cell, all possess a well defined cell wall.

802. How many sub-phyla are available in Tracheata, according to Tippos classification of kingdom plantae ?

(a) 4 (b) 6
(c) 8 (d) 10

WB JEE-2006

Ans. (a) : According to Tippo's classification of kingdom Plantae, there are four sub-phyla available in Tracheata. The four sub-phyla's are as follows :
(i) Pteropsida
(ii) Lycopsida
(iii) Sphenopsida
(iv) Psilopsida

803. Which group is evolutionary modern?

(a) Gymnosperms (b) Grasses
(c) Pteridophytes (d) Algae

Rajasthan PMT-2004

Ans. (b) : The evolutionary modern group is grasses (i.e. Angiosperms). The angiosperms are characterised by the presence of triploid endosperm, ovary and double fertilization.

804. Select the true statements (1) Aldrovanda is rootless, free floating insectivorous aquatic plant (2) Sarracenia is a pitcher like plant (3) Rafflesia is a total stem parasite (4) Striga is a parasite of khuskhus

(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (b) : The *Rafflesia* is a total root parasite whereas *Striga* is a parasite on sugarcane.
- *Aldrovanda* is a free - floating and rootless aquatic plant.
- American pitcher plant of the genus Sarracenia, having single nodding flowers and leaves modified as pitchers that trap and digest insect.

805. Aerenchyma provides :

(a) Flexibility to plants
(b) Mechanical strength to plants
(c) Buoyancy to hydrophytic plants
(d) Promoting nature of photosynthesis

Uttarakhand PMT-2004

Ans. (c) : Aerenchyma provides buoyancy to hydrophytic plants. It is the space of air channels in the leaves which provides buoyancy to hydrophytic plants and do not promote nature of photosynthesis, flexibility to plants or mechanical strength to plants.

806. Insectivorous plants grow in a soil :

(a) deficient in iron (b) rich in nitrogen
(c) deficient in nitrogen (d) deficient in calcium

HP CET-2011

Ans. (c) : Insectivorous plants grow in a soil deficient in nitrogen. These plants are green plants which synthesize their own food and use small insects only to fulfill their nitrogen requirements.

807. A branch of botany concerned with the classification, nomenclature and identification of plants is

(a) Physiology (b) Morphology
(c) Ecology (d) Systematic Botany

JIPMER-2000

Ans. (d) : A branch of botany concerned with the classification, nomenclature and identification of plants is **systematic botany**.
- It is concerned with the evolution of organisms relationships.

808. Which of the following is called stinging nettle?

(a) Utricaurens (b) Adhatoda
(c) Verbascum (d) None of these

AMU-2003

Ans. (a) : Utricaurens commonly called as annual nettle, dwarf nettle, small nettle, dog nettle or burning nettle, is a herbaceous annual flowering plant species in the nettle family Urticaceae which is native to Eurasia including the Himalayan regions of Kalimpong, Darjeeling and Sikkim in India and can be found in North America, etc. It contain silicious tips and have poison which is injected into the skin of animals rubbing against them.

@apna_pdf

F. Animalia

809. Assertion (A) : Pneumaticity of bones is the unique feature of reptiles.
Reason (R) : Air sacs associated with lungs of birds facilitate continuous oxygenation of blood.
(a) Both A and R correct explanation of A
(b) Both A and R are correct but R is not correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct.
AP EAPCET-22.05.2023, Shift-II

Ans. (d) : The penumatic bones is a typical characteristic feature of birds not a reptiles. Such bones have air cavities within, so as to reduce the overall body weight and thereby, make flight easier. It is also called as a hollow bone.
Respiration is by lungs in class Aves (birds). The lungs are spongy and inelastic. Air sacs are connected to the lungs to supplement respiration. It facilitate continuous oxygenation of blood in birds.
Hence, Assertion (A) is incorrect and Reason is correct.

810. Assertion (A) : Methanogens are present in the rumen of cattle.
Reason (R) : They help in breakdown of cellulose and nutrition of cattle.
(a) Both A and R correct explanation of A
(b) Both A and R are correct but R is not correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct.
AP EAPCET-22.05.2023, Shift-II

Ans. (b) : Methanogens are present in the gut of ruminant of cattle to digest the carbohyrate (cellulose) ingested by animals. Cellulose breakdown into glucose, thus providing a source of energy for the cattle. Hence, it is involved in providing nutrition to the cattle by forming carbohydrates. So, the (b) one is right where both (A) and (R) are correct but (R) is not correct explanation of (A).

811. Match List-I with List-II

	List-I		List-II
(A)	Contractile vacuole	(i)	Asterias
(B)	Water vascular system	(ii)	Amoeba
(C)	Canal system	(iii)	Spongilla
(D)	Flame cells	(iv)	Taenia

Choose the correct answer from the options given below:
(a) (A)-(iii), (B)-(ii), (C)-(i), (D)-(iv)
(b) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
(c) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)
(d) (A)-(i), (B)-(iii), (C)-(ii), (D)-(iv)
RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Contractile vacuole is present in Amoeba and helps in osmoregulation . Water vascular system is the most distinctive feature of Echinoderms such as Asteriasis, Echinus etc. Sponges have water transport or canal system in spongilla.
Platyhelminthes like Taenia have specialized cells called flame cells that helps in osmoregulaion and excretion.
Contractile Vacuole → Amoeba
Water Vascular system → Asterias
Canal system → Spongilla
Flame cells → Taenia

812. Study of animal behaviour is
(a) Ecology (b) Evolution
(c) Ethology (d) Eugenics
TS EAMCET-31.07.2022 Shift-II

Ans. (c) : Study of animal behavior is called ethology. It focuses on the behaviors of diverse organisms in their natural environment.

813. Which of the following statements are correct in relation to host & parasites?
i) The host in which parasite undergoes asexual reproduction is secondary host
ii) Female Culex mosquito is the primary host for Wucheraria
iii) In primary host parasite undergoes sexual reproduction
iv) Man is the primary host for Plasmodium
v) The host that lodges the infective stages of a parasite in its body when the main host is not available is called Reservoir host
Options:
(a) Only (ii), (iii) and (iv) are correct, (i) and (v) are wrong
(b) Only (i), (iii) and (v) are correct, (ii) and (iv) are wrong
(c) Only (i) and (v) are correct but (ii), (iii) and (iv) are wrong
(d) Only (ii) and (iv) are correct, remaining are wrong
AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The host in which parasite undergoes asexual reproduction is secondary host. In primary host parasite undergoes sexual reproduction, and the host that lodges the infective stages of a parasite in its body when the main host is not available is called reservoir host.
Hence, statement I, III and V are correct in the context of host and parasite while statement II and IV are not correct regarding host and parasite.

814. In Caecilians, vertebrae are
(a) Procoelous (b) Opisthocoelous
(c) Amphicoelous (d) Heterocoelous
AP EAPCET-12.07.2022 Shift-I

Ans. (c) : In Caecilians, vertebrae are Amphicoelous. Caecilians are a group of vermiform or serpentine amphibians.

815. Which of the following statements is correct ?
(a) All the enterocoelomates are deuterostomes and they exhibit radial and indeterminate cleavage

@apna_pdf

(b) All the enterocoelomates are protostomes and they exhibit radial and indeterminate cleaveage
(c) All the enterocoelomates are protostomes and they exhibit spiral and determinate cleavage
(d) All the enterocoelomates are protostomes and they exhibit spiral and determinate cleavage

AP EAMCET-11.07.2022 Shift-II

Ans. (a) : All the enterocoelomates are deuterostomes, because radial cleavage is characteristics of deuterostomes, and results in indeterminant cells.

816. Match the following:

List-I		List-II	
(A)	**Physalia**	**(i)**	**Pearl oyster**
(B)	**Limulus**	**(ii)**	**Portuguese Man of War**
(C)	**Ancylostoma**	**(iii)**	**Living fossil**
(D)	**Pinctada**	**(iv)**	**Hookworm**

Choose the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(i)	(iv)	(iii)	(ii)
(b)	(ii)	(iii)	(i)	(iv)
(c)	(iv)	(i)	(iii)	(ii)
(d)	(ii)	(iii)	(iv)	(i)

NEET-2021

Ans. (d) :

	List-I	List-II
(A)	Physalia	Portuguese Man of War
(B)	Limulus	Living fossil
(C)	Ancylostoma	Hookworm
(D)	Pinctada	Pearl oyster

817. Among the following, which one is not a deuterostome?
(a) Sea urchin (b) Earthworm
(c) Sand dollar (d) Ichthyophis

J&K CET-2011

Ans. (b) : Earthworm is not a deuterostome. Deuterostome is an animal from phylum which means "second mouth". They include Echinodermata and Chordata. An earthworm is a terrestrial invertebrate that belongs to the phylum Annelida. They exhibit a tube-within-a-tube body plan.

818. Which of the following statements are correct with regard to deuterostomes ?
I. The blastopore develops into anus in adult
II. The blastopore develops into mouth in adult
III. Cleavage is radial and indeterminate
IV. Cleavage is spiral and determinate
(a) I and III (b) I and II
(c) II and IV (d) II and III

AP EAMCET-2010

Ans. (a) : Deuterostomes are a super-phylum of animal they are distinguished by their embryonic development . In deuterosome the first opening (blastospore) becomes the anus while in **protostomes** becomes the mouth. They are also known as **enterocoelomate** because their colon develops through enterocoely. The cleavage is radial and indeterminate.

819. The possible beneficial aspect of grazing animals is the
(a) removal of wild animals and pests
(b) eradication of weeds
(c) removal of wild plants
(d) addition of their excreta into the soil

HP CET-2011

Ans. (d) : The possible beneficial aspect of grazing animals is the addition of their excreta into the soil.
Grazing of animals could destroy the greenery of the land by consuming grass and other wild crops. Overgrazing is considered as a significant reason for desertification. It leads to increased soil erosion and makes the soil compact but there is a positive effect of grazing even in agriculture too. Moderate grazing can be beneficial because it leads to the addition of excreta of the animals into the soil and this enriches organic matter to the soil so that it can provide essential mineral nutrition to the plants.

G. Notes on Viruses, Viroids, Prions and Lichens

820. Which of the following are most suitable indicators of SO_2 pollution in the environment?
(a) Fungi (b) Lichens
(c) Conifers (d) Algae

AIPMT (Re-Exam)-2015
UP CPMT-2007 / AIPMT-1992
JIPMER-2005

Ans. (b) : Lichens are most suitable indicators of SO_2 pollution in the environment.

821. Which of the following is a 'cyanophage'?
(a) S-13 (b) $\phi \times 174$
(c) SV-40 (d) LPP-1

AIIMS-2014
BVP-2001
AIIMS-1995
Manipal-2001

Ans. (d) LPP-1 was the first cyanophage which was discovered by **Safferman and Moris (1963).** This name was given to this cyanophage. The phages (viruses) that infect cyanobacteria are called as cyanophages. LPP-1 is a cyanophage and infects the blue-green algae *Plectonema boryanum*.

822. Select the viruses in the same order based on the morphology given below,
- **Spikes**
- **Roughly spherical envelop**
- **Rigid long rods**

(a) Rabies virus, polio virus, Measles virus
(b) Polio virus, Herpes simplex virus, Rabies virus
(c) Measles virus, Influenza virus, Rabies virus
(d) Rabies virus, Tobaco mosaic virus, Polio virus

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Spikes, roughly spherical envelop, rigid long rods are present in measels virus and influenza virus and Rabies virus.

@apna_pdf

Measles virus contains single-stranded RNA of negative polarity. It has spikes. The influenza virus is an enveloped virus that derives its lipid bilayer from the plasma membrane of a host cell. It has roughly spherical envelop structure. Rabies virions are bullet-shaped. It has long rigid rods.

823. Which of the following viruses are cancer causing?

(a) Herpes, AIDS and Ebola
(b) Rabies and Neonatal Rubella
(c) Human Papilloma Virus and Chronic Hepatitis B
(d) Chicken pox and warts

TS EAMCET-11.05.2023, Shift-II

Ans. (c) : Human Papilloma Virus and Chronic Hepatitis B viruses are cancer causing. The viruses that cause human cancer include hepatitis B virus (liver cancer) and papilloma viruses (cervical and other anogential cancers). Cancer causing viruses are called 'Oncogenic viruses. These viruses cause cancer.

824. Assertion (A) : Viruses cannot multiply unless they invade a specific host cell and instruct its genetic and metabolic machinery to make and release daughter or progeny viruses
Reason (R) : Viruses are obligate intracellular parasites
The correct option among the following is

(a) (A) and (R) are true, (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : Viruses are small, intracellular and obligate parasite. They cannot reproduce or live separately.
Viruses are the machinery of the host cells to reproduce. They can only multiply inside the living cell of host because they lack organelles or a nucleus. Viruses do not have any specialized machinery to produce energy, grow, reproduce, or maintain homeostasis by themselves.

825. Match the following

List - I		List - II	
(I)	Helical virus	(A)	Bacteriophage
(II)	Glycoprotein	(B)	Rabies virus
(III)	Complex viruses	(C)	Influenza virus
(IV)	Enveloped virus	(D)	Measles virus

(a) I B II D III A IV C
(b) I B II C III D IV A
(c) I C II A III B IV D
(d) I B II A III C IV D

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : Helical Virus– In this virus, the viral nucleic acid coils into a helical shape and the capsid proteins wind around the inside or outside of the nucleic acid, forming a long tube or rod-like structure. Ex.- Rabies virus.
Glycoprotein– The glycoprotein of some viruses play an important role in host infection, especially in the recognition of the host cell. Ex.- Measles virus.
Complex Viruses– Virus possess capside which is neither purely helical, nor purely icosahedral and which may have extra structure such as protein tails or a complex outer wall. Ex.- Bacteriophage.
Enveloped Virus– In contain the viral genome and core proteins wrapped within one or more membranes. Ex.- In influenza viruses, the genome of which consists of segmented negative-sense single-strand RNA segments.

826. Bovine spongiform encephalitis disease is caused by _____

(a) Viroid (b) Bacteria
(c) Virus (d) Prions

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : Bovine Spongiform Encephalitis (BSE) disease is caused by prions. Prions are misfolded protein molecule, which become infectious due to their ability to transfer their faulty structure to their normal variants too. It is a progressive neurological disorder of cattle. BSE is also known as mad cow diseases, is a progressive and fatal neurologic diseases of cattle.

827. The virus which causes Bird flu is

(a) H_1N_1 (b) H_3N_2
(c) H_5N_1 (d) H_2N_2

TS EAMCET-30.07.2022 Shift-II

Ans. (c) : Highly Pathogenic Avian Influenza (HPAI) (H_5N_1) virus causes bird flu. These virus naturally spread among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species. Bird flu is viruses do not normally infect humans. Swine flu is caused by the H_1N_1 virus, which started in pigs.

828. Identify the phage that attacks a host cell but do not destroy it immediately

(a) Virulent phage (b) Mycophage
(c) Temperate phage (d) Zoophage

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Temperate phages exhibits lysogeny are considered as natural vectors for gene transmission among bacteria.
Escherichia coli viruses which are well-studied temperate phages can integrate their genomes into DNA at random transposition site-specific recombination.

829. Match List-I with List-II:

List-I		List-II	
A.	Bacteriophage Φ×174	i.	48502 base pairs
B.	Bacteriophage lambda	ii.	5386 nucleotides
C.	Escherichia coli	iii.	3.3×10^9 base pairs
D.	Haploid content of human DNA	iv.	4.6×10^6 base pairs

Choose the correct answer from the options given below:

(a) (A) - (i), (B) - (ii), (C) - (iii), (D) - (iv)
(b) (A) - (ii), (B) - (iv), (C) - (i), (D) - (iii)
(c) (A) - (ii), (B) - (i), (C) - (iv), (D) - (iii)
(d) (A) - (i), (B) - (ii), (C) - (iv), (D) - (iii)

NEET (Re-Exam)-04.09.2022

@apna_pdf

Ans. (c) :

(A)	Bacteriophage $\phi \times 174$	5386 nucleotides
(B)	Bacteriophage lambda	48502 base pairs
(C)	Escherichia coli	4.6×10^6 base pairs
(D)	Haploid content of human DNA	3.3×10^9 base pairs

830. Mad cow disease in cattle and Cr Jacob disease in humans are due to infection by _____.

(a) Bacterium (b) Virus
(c) Viroid (d) Prion

NEET (Re-Exam)-04.09.2022

Ans. (d) : Mad cow disease in cattle and Cr Jacob disease in humans are due to infection by prions. 'Mad cow disease' is commonly called as Bovine spongiform encephalopathy (BSE).
This disease is progressive neurological disorder in which the cattle experiences trouble while walking , weight loss and shows abnormal behavior. Prions were named by Stanley Prusiner.
Creutzfeldt - Jakob disease (CJD) is a rare brain disorder that causes unique changes in brain tissue and affects muscle coordination, thinking and memory.

831. Prophage is viral genome _____

(a) Freshly synthesized
(b) Inoculated to a bacterium
(c) Outside the host cell
(d) Incorporated and integrated to host genome

AP EAMCET-03.09.2021 Shift-II

Ans. (d) : Prophage is viral genome (bacteriophage) which is incorporated and integrated to the host genome. This is a latent form of a phage in which the viral genes are present in the bacterium without causing disruption of the bacterial cell.
Prophage is the first stage of cell division.

832. Identify the correct statements among the following.

(A) No virus contains both DNA and RNA
(B) Viroids were named by T.O. Diener.
(C) Scrapie disease of sheep is caused by proteins
(D) In six kingdom classification three domains are present

(a) A, B ,C (b) B, C, D
(c) A, B, D (d) A, C, D

TS EAMCET-09.08.2021 Shift-II

Ans. (a) : Virus is an extremely small entity which contains either RNA or DNA as the genetic material. They are also smaller than most bacteria.

- **In 1971 Theodor Diener** showed that the agent was not a virus, but a totally unexpected novel type of pathogen, the size of typical viruses, for which he proposed the term '**viroid'**.
- Scrapie is a neurodegenerative disease of sheep and goats and is also caused by Prions.
- The three-domains of Carl Woese's classification system include archaea, bacteria, eukaryotic and six kingdoms are Archaebacteria (ancient bacteria), Eubacteria (True bacteria), Protista, Fungi, Plantae, Animalia.

833. Match the following :

a.	**Viroid**	**i.**	**Pollution indicators**
b.	**Prions**	**ii.**	**Detection of toxic pollutants**
c.	**Biosensors**	**iii.**	**Potato spindle tuber disease**
d.	**Lichens**	**iv.**	**Scrapie disease**

(a) (a – iii), (b – iv), (c – ii), (d – i)
(b) (a – iii), (b – iv), (c – i), (d – ii)
(c) (a – i), (b – ii), (c – iv), (d – iii)
(d) (a – ii), (b – iii), (c – iv), (d – i)

AP EAMCET-25.09.2020 Shift-II

Ans. (a) : The disease of the potato spindle tuber is caused by viroid. The first viroid to be described was the potato spindle tuber viroid (PSTVd).

- Scrapie is a neurodegenerative disease of sheep and goats, is caused by prions. Classical scrapie is spread from an infected dam to her offspring and other sheep or goats.
- Biosensors usage is essential for monitoring actual is essential for monitoring actual conditions of soil, water and air samples to detect pollutants such as pesticides, pathogens and chemical compounds.
- Lichens are sensitive to atmospheric pollution such as nitrogen because they receive all their nutrients and water from wet and dry atmospheric deposition.

834. Classification of Virus is done by _____

(a) IBTV (b) ICBN
(c) ICTV (d) ICZN

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : The formal taxonomic classification of viruses is the responsibility of the International Committee on Taxonomy of Viruses (ICTV) system. The ICTV was established in 1966 as the International Committee on Nomenclature of Viruses (ICNV), and was renamed the ICTV in 1977.

- ICBN-International Code of Botanical Nomenclature.
- ICZN-International Code of Zoological Nomenclature.
- TBTV - Infectious Bluetongue Viruses.

835. The algal partner of the lichen is called _____.

(a) photobiont or mycobiont
(b) phytobiont or mycorrhiza
(c) phycobiont or photobiont
(d) mycobiont or phycobiont

MHT CET-07.10.2020 Shift-I

Ans. (c) : Lichens are composite organisms that show the symbiotic association between algae and fungi.

- The algal component of a lichen is known as photobiont or phycobiont because the algae partner is photosynthetic. The fungal component is known as mycobiont.

836. The capsid of tobacco mosaic virus (TMV) has capsomere numbering ____

(a) 2130 (b) 1230
(c) 2310 (d) 3120

AP EAMCET-24.09.2020 Shift-I
KCET-2000

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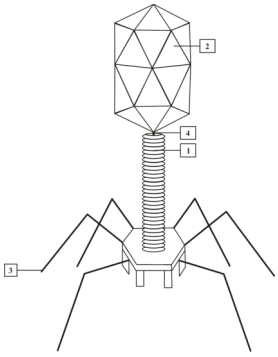
Ans. (a) : TMV is also known as the tobacco mosaic virus. TMV is a simple rod shaped helical virus that consist of single- stranded RNA enveloped by a protein coat called capsid. This capsid is made of 2130 subunits called capsomeres.

837. Identify the parts labelled 1,2,3,4 in the given figure



(a) 1. Sheath, 2. Head, 3. Tail fiber, 4. Collar
(b) 1. Head, 2. Sheath, 3. Collar, 4. Tail fiber
(c) 1. Collar, 2. Tail fiber, 3. Sheath, 4. Head
(d) 1. Tail fiber, 2. Collar 3. Sheath, 4. Head

AP EAMCET-24.09.2020 Shift-I

Ans. (a) : A bacteriophage is a bacteria - eating virus, these viruses are endoparasite of bacteria. A bacteriophage is type of virus or an envelope of protein that has genetic material such as DNA or RNA in it. Bacteriophase having the components can be understood by comparing if with the human body. As we move upside down, the uppermost part is the head and then comes the neck. The tails remains covered by the sheath, so the darkened part is the sheath. The last part should be the tail fibres.

838. Which of the following is correct about viroids?

(a) They have free RNA without protein coat
(b) They have DNA with protein coat
(c) They have free DNA without protein coat
(d) They have RNA with protein coat

NEET-2020 Phase-I

Ans. (a) : Viroids are small, circular single stranded RNA molecule without protein coat. They have unusual properties such as resistance to ribonulcease digestion and denaturation. Viroid is basically a plant pathogen that consists of short stretch of highly complementary, circular single stranded RNA. They are responsible for causing disease in plant like potato spindle tuber disease.

839. Match the column-I and column-II

Column-I	Column-II
(i) Viroid	**(A) Ramachandran**
(ii) Cell	**(B) Leeuwenhoek**
(iii) Virus	**(C) T.O. Diener**
(iv) Triple helical structure of collagen	**(D) Ivanovsky**

(a) i–B, ii–A, iii–C, iv–D
(b) i–A, ii–B, iii–D, iv–C
(c) i–C, ii–B, iii–D, iv–A
(d) i–D, ii–B, iii–C, iv–A

AIIMS-26.05.2019 Shift-II

Ans. (c) :

(i)	Viroid	T.O. Diener
(ii)	Cell	Leeuwenhoek
(iii)	Virus	Ivanovsky
(iv)	Triple helical structure of collagen	Ramachandran

- Viroids are the smallest infectious pathogens. They are composed of circular, single stranded RNA that has no protein coating. The term viroid was introduced by T.O. Diener.
- Leeuwenhoek with the improved microscope, discovered the free living cells in ponds water for the first time.
- Dmitri Ivanovsky, in studying a disease that affects tobacco plants, paved the way for the discovery of the infectious particle known as a virus.
- Collagen is the most abundant protein in our body. It is the major component of connective tissues that create several body parts, including tendons, ligaments, skin, and muscles. Prof. Ramachandran proposed the triple helical structure of collagen.

840. Which of the following statements is incorrect?

(a) Viruses are obligate parasites.
(b) Infective constituent in viruses is the protein coat.
(c) Prions consist of abnormally folded proteins.
(d) Viroids lack a protein coat.

NEET-2019

Ans. (b) : Infective constituent in virus is not the outer protein coat, but the genetic material inside the cell. Viruses can have either DNA or RNA as their genetic material. Viruses are obligate parasites, i.e they are found everywhere.

- Virus can not replicate alone.
- Viruses must infect cells and use components of the host cell to make copies of themselves.

Prions – Prions are misfolded protein with the ability to transmit their misfolded shape into normal variants of same protein.

Viroids- They are small infectious pathogen, they are composed of a short strand of circular, single stranded RNA that has no protein coat.

841. Mad cow disease in cattle is caused by an organism which have :

(a) Free DNA without protein coat
(b) Inert crystalline structure
(c) Abnormally folded protein
(d) Free RNA without protein coat

NEET (Odisha)-2019

Ans. (c) : The abnormally folded proteins known as prions. The causative agent of mad – cow disease is a prion. It is a fatal neurological disease or encephalopathy in cattle that causes a spongy degeneration in the brain and spinal cord. This disease is caused when a normal prion protein folds into an abnormal shape and no longer breaks down inside the body.

842. Which of the following statements is correct?

(a) Lichens are not good pollution indicators.
(b) Lichens do not grow in polluted areas.

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(c) Algal component of lichens is called mycobiont
(d) Fungal component of lichens is called phycobiont.

NEET (Odisha)-2019

Ans. (b) : Lichens do not grow in polluted areas because lichens have no roots or protective surface, they can not filter what they absorb, so whatever in the air is taken straight inside. Some sensitive lichen species develop structural changes in response to air pollution including reduced photosynthesis and bleaching. Pollution can also cause the death of the lichen algae, discoloration and reduced growth of the lichen fungus, or kill a lichen completely.

843. HIV belongs to the Genus
(a) Hunnivirus (b) Lentivirus
(c) Lolavirus (d) Vitrivirus

AP EAMCET-25.04.2018 Shift-II

Ans. (b) : Genus Lentivirus – HIV is a lentivirus because it is a slow virus. It takes the virus to replicate enough to cause symptoms in the host.
The two human immunodeficiency viruses HIV-1, HIV-2 are members of the family of retroviruses in the genus of lentivirus.

844. Arrange the following steps in the order of their occurance in the lytic cycle of a phage.
(i) Maturation phase
(ii) Penetration phase
(iii) Attachment
(iv) Release phase
(v) Biosynthesis
The correct sequence is
(a) (iii), (i), (iv), (v), (ii) (b) (i) (iii), (iv), (v), (ii)
(c) (ii), (i), (iii), (v), (iv) (d) (iii), (ii), (v), (i), (iv)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : Attachment – Attachment involves the bacteriophage attaching to the bacterial host cell.
Penetration – Penetration involved the movement of bacteriophage into the bacterial cell.
Biosynthesis- Biosynthesis involves the production of phage protein and genome replication.
Maturation- Maturation involves the assembly of new bacteriophage particles.
Release Phase– Involves the lysis of the bacterial cell resulting in the release of newly produced bacteriophage particles.

845. Study the following lists :

List-I	List-II
(A) Prions	**(i) Saprophytic and parasitic organisms**
(B) Viroids	**(ii) Lacks the protein coat and RNA is of low molecular weight**
(C) Phycobiont	**(iii) Infectious agents which possess only proteins but not nucleic acids**
(D) Mycoplasma	**(iv) The algal component in a symbiontic association**
	(v) Organisms that completely lack a cell wall and are pleomorphic

The correct answer is

	A	B	C	D
(a)	(iii)	(i)	(ii)	(iv)
(b)	(v)	(ii)	(iii)	(i)
(c)	(i)	(v)	(iv)	(ii)
(d)	(iii)	(ii)	(iv)	(v)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) :

	List – I	List - II
a.	Prions	Infectious agents which possess only proteins but not nucleic acids
b.	Viroids	Lacks the protein coat, and RNA is of low molecular weight
c.	Phycobiont	The algal component in a symbiontic association
d.	Mycoplasma	Organisms that completely lack a cellwall and are pleomorphic

846. Match the column

(A) Virus	**(i) Schwann**
(B) Viroid	**(ii) T.O. Diener**
(C) Cell	**(iii) Pasteur**
(D) Ribosome	**(iv) Palade**

(a) A–iii, B–ii, C–i, D–iv
(b) A–ii, B–i, C–iv, D–iii
(c) A–i, B–ii, C–iii, D–iv
(d) A–iv, B–iii, C–i, D–ii

AIIMS-26.05.2018 Shift-I

Ans. (a) : Louis Pasteur developed the 1st vaccine against rabies virus
- T.O. Diener discovered a new infectious agent that was smaller than virus, called viroid. A viroid is a single stranded RNA that caused potato spindle tuber disease.
- Shliden and Schwann gave the cell theory.
- Ribosome's are also called Palade particles, discovered by George Palade in 1955 with the help of an electron microscope.

847. Viroids differ from viruses in having :
(a) DNA molecules with protein coat
(b) DNA molecules without protein coat
(c) RNA molecules with protein coat
(d) RNA molecules without protein coat

NEET-2017

Ans. (d) : Viroids differ from viruses in having RNA molecules without protein coat.

848. Which ONE of the following statements is CORRECT about the tobacco mosaic virus?
(a) It affects all monocotyledonous plants
(b) It affects photosynthetic tissue of the infected plants
(c) It does not infect other species belonging to the Solanaceae
(d) It infects gymnosperms

KVPY (SA)-05.11.2017

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Ans. (b) : Tobacco mosaic virus affects photosynthetic of the infected plant. It affects all Solanaceae family, specially tobacco and tomato plants.
It affects the photosynthetic tissue, leaves of the infected plants. In the disease, there is mosaic - like motting and discoloration on the leaves is observed.

849. There exists a close association between the alga and the fungus within a lichen. The fungus
(a) Provides food for the alga
(b) Provides protection, anchorage and absorption for the alga
(c) Fixes the atmospheric nitrogen for the alga
(d) releases oxygen for the alga

AIPMT-2005

Ans. (b) : There exists a close association between the alga and the fungus within a lichen. The fungus provides protection, anchorage and absorption for the alga. fungus forms the body of lichen as well as it attaches and in absorbing mineral and nutrients.

850. Choose the wrong statement
(a) Mosaic disease in tobacco and AIDS in human being are caused by viruses
(b) The viroids were discovered by D.J. Ivanowsky
(c) W.M. Stanley showed that viruses could be crystallized
(d) The term contagium vivum fluidum was coined by M.W. Beijerinck
'contagium vivum fluidum'

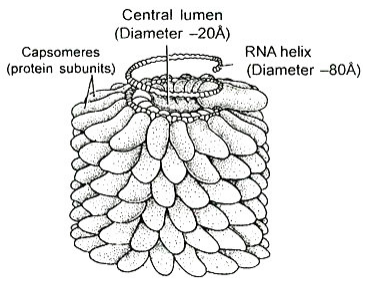
AIPMT (Re-Exam)-2015

Ans. (b) : Viroids were discovered by **T.O Diener** while D.J Ivanowsky discovered first virus, tobacco mosaic virus (TMV).

851. Which of the following shows coiled RNA strand and capsomeres?
(a) Polio virus (b) Tobacco mosaic virus
(c) Measles virus (d) Retrovirus

AIPMT-2014

Ans. (b) : Tobacco mosaic virus shows coiled RNA strand and capsomeres. It is a plant virus that is associated with genus Tobamovirus. It mainly infects tobacco plants, potatoes, tomato and other members which comes under Solanaceae family.
It is covered by a protective protein coat called capsid that covers the virus's genetic material.
- Polio virus has ss positive-sense RNA genome and a protein capsid.
- Measles virus is a ss, negative strand, enveloped RNA virus. Retrovirus is a family of enveloped viruses.



STRUCTURE OF TOBACCO MOSAIC VIRUS

852. Tobacco mosaic virus (TMV) genes are:
(a) single stranded RNA
(b) double stranded DNA
(c) proteinaceous
(d) double stranded RNA

AIPMT-1994 / BVP-2002

Ans. (a) : Tobacco mosaic virus (TMV) genes are single stranded RNA. It is a rod shaped helical virus consisting of centrally located single stranded RNA covered by a protein coat called capsid.

853. Viruses possess:
(a) ribosomes to synthesize protein
(b) organelle for its vital mechanism
(c) either DNA or RNA
(d) none of these

AIPMT-1997

Ans. (c) : All viruses have genetic material made of nucleic acid. The nucleic acid encodes the genetic information unique for each virus.
The nucleic acid may occur as single or double strands. Viruses contain either DNA or RNA, never both.

854. Most of the lichens consist of:
(a) green algae and ascomycetes
(b) brown algae and higher plant
(c) blue green algae and basidiomycetes
(d) red algae and ascomycetes

AIPMT-1997

Ans. (a) : Most of the lichens consist of green algae and ascomycetes.
Algal component, phycobiont which are mostly blue-green algae (Nostoc, Scytonema) or green algae (Trebouxia, Trentophila etc.)

855. Litmus is obtained from
(a) Rocella montagnei (b) Lasallia pustulata
(c) Both (a) and (b) (d) Cladonia crispata

JIPMER-2005

Ans. (c) : Litmus is obtained from *Rocella montagnei* and *Lasallia pustulata*. Litmus is a blue dye extracted from various species of lichen. It is used as an acid-base indicator. It gives red colour with acidic medium and blue colour with basic medium.

856. Retrovirus have genetic material
(a) DNA only
(b) RNA only
(c) DNA or RNA only
(d) either DNA or RNA only

JIPMER-2008

Ans. (b) : Retrovirus have genetic material RNA only because, a retrovirus is a virus that uses RNA as its genomic material. Upon infection with a retrovirus, a cell converts the retroviral RNA into DNA, which in turn is inserted into the DNA of the host cell. Most retroviruses are spherical particles, approximately 100 nm in diameter, consisting of an internal protein core surrounded by an envelope of glycoprotein's embedded in a lipid bilayer.

857. The genetic material in tobacco mosaic virus is
(a) ss DNA (b) ss RNA
(c) ds RNA (d) ds DNA

AIIMS-2016

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Ans. (b) : The genetic material in tobacco mosaic virus is ssRNA. It is a plant virus that is associated with genus 'Tobamovirus'.
TMV is the most stable virus known. It can multiply only in the presence of a host.

858. Which of the following structure helps in the respiration of lichens?
(a) Soredia (b) Isidia
(c) Cyphella (d) Cephalodia.

AIIMS-2002

Ans. (c) : Cyphella is a genus of fungi in the family Cyphellaceae. Cyphella are the small pores or pits present in the lower cortex region of foliose lichens.
They are small circular depressions and are found irregularly scattered on the underside of some lichens such as Sticta. They contain definite rim made of spherical thin walled cells and open into the medulla of the lichen. They perform respiratory functions.

859. The antibiotics have no effect on viruses because:
(a) Viruses show metabolism of their own
(b) Viruses are too small in size for antibiotics to act upon them
(c) Viruses show no metabolism of their own
(d) Viruses produce a thick covering and encyst themselves as endospores

AIIMS-2015

Ans. (c) : Viruses do not have metabolism of their own, they use host cells to perform their activities for them.
Viruses called as connecting link between living and non-living. Viruses are surrounded by a protective protein coat instead of cell wall. A virus is not a living cell. A virus is just a protein coat and the genetic material sits inside this coat and it cannot make more of itself without a host. Hence, antibiotics can not affect viruses.

860. Viroids have:
(a) Single stranded RNA not enclosed by protein coat
(b) Single stranded DNA not enclosed by protein coat
(c) Double stranded DNA enclosed by protein coat
(d) Double stranded RNA enclosed by protein coat.

AIIMS-2003
Punjab MET-2006

Ans. (a) : Viroids have single stranded RNA not enclosed by protein coat. Viroids are typically called as **plant pathogens.** They are small, single-stranded, RNA particles. Viroids are single stranded covalently closed circular RNA molecules existing as highly base paired rod-like structure. They do not have a capsid or outer envelope of protein making them simpler than virus, but same as viruses, they can **reproduce only within a host cell**.

861. Which of the following statements is wrong for viroids
(a) Their RNA is of high molecular weight
(b) They lack a protein coat
(c) They are smaller than viruses
(d) They cause infections

NEET-2016 Phase-I

Ans. (a) : In viroid, RNA is of low molecular weight. They have no protein coating. Viroids are smaller than virus that is responsible for causing disease in plants. It is found to be a free RNA and is devoid of protein coat that is generally present in viruses viroids are single-stranded covalently closed circular RNA molecules existing as highly base-paired rod-like structure.

862. Infectious proteins are present in –
(a) Gemini viruses (b) Prions
(c) Viroids (d) Satellite viruses

AIPMT (Screening)-2010

Ans. (b) : A prion is a type of protein that triggers normal proteins in the brain to fold abnormally. It can cause disease in animals and humans.
Geminiviruses- It is a plant virus, it has single stranded DNA (ssDNA) .
Satellite viruses - It is a virus completely dependent on a helper virus for replication.

863. Which one of the following does not follow the central dogma of molecular biology ?
(a) Pea (b) Mucor
(c) Chlamydomonas (d) HIV/ HIV

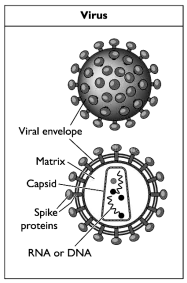
AIPMT (Screening)-2010

Ans. (d) : HIV belongs to retrovirus group which show reverse central dogma or reverse transcription. The biggest revolution in the central dogma was the discovery of retroviruses, which transcribe RNA into DNA through the use of a special enzyme called reverse transcriptase has resulted in an exception to the central dogma.

864. Virus envelope is known as –
(a) Capsid (b) Virion
(c) Nucleoprotein (d) Core

AIPMT (Screening)-2010

Ans. (a) : The virus envelope is known as a capsid. A virus consists of a nucleic acid core and outer protein coating called capsid. An outer envelope made of protein and phospholipids membranes derived from the host cell. The capsid is made up of protein subunits called capsomere.



865. 'Reindeer moss' is common name for
(a) Funaria hygrometrica (b) Marchantia sp
(c) Cladonia rangiferina (d) Polytrichum sp

JIPMER-2004

Ans. (c) : Reindeer moss is common name of *Cladonia rangiferina.* It rarely reaches more than 17cm in height. Reindeer moss has the ability to convert sunlight into food in low temperature and low light conditions.
Reindeer moss is a fruticose lichen found in arctic region.

866. There exists a close association between the alga and the fungus within a lichen. The fungus
(a) fixes the atmospheric nitrogen for the algae
(b) provides protection, anchorage and absorption for the algae

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(c) provides food for the algae
(d) releases oxygen for the algae

JIPMER-2007

Ans. (b) : Lichen is the symbiotic relationship between algae and fungi. They exists a close association between the algae and fungus within a lichen. The fungus provides protection, anchorage and absorption for the algae.

867. Which of the following is true regarding the phage lambda, a virus which infects bacteria?
(a) In the lytic cycle, the bacterial host replicates viral DNA, passing it on to daughter cells during binary fission
(b) In the lysogenic cycle, the bacterial host replicates viral DNA, passing it to daughter cells during binary fission
(c) In the lytic cycle, viral DNA is integrated into the host genome
(d) In the lysogenic cycle, the host bacterial cell burst, releasing phases

JIPMER-2015

Ans. (b) : The lysogenic cycle is a type viral replication in which the nucleic acid of a bacteriophage is associated with a host. Viral DNA is passed into daughter cells as host cells reproduce.

868. A term helotism is used for the symbiosis of
(a) Algae and fungi (b) Algae and Cycas
(c) Algae and bacteria (d) Pinus and fungi

AP EAMCET-2007

Ans. (a) : Helotism term refers to the symbiotic association of algae and fungi which is commonly called **Lichen**. Lichen is a complex organism that comprises the association of two different living bodies, named algae or cyanobacteria and the fungi.
The phenomenon of controlled parasitism is called helotism.

869. Enzymes not found in:
(a) Fungi (b) Algae
(c) Virus (d) Cyanobacteria

AIPMT-2000 / JIPMER-2004

Ans. (c) : A virus is a submicroscopic non-living infectious agent that replicates only inside the living cells of other organisms. Virus is made of the genetic material which is either DNA or RNA that carry genetic information, a protein coat, called the capsid which surrounds and protects the genetic material and an envelope of lipids that surrounds the protein coat. **Viruses do not contain enzymes** or any other metabolic machinery so they use host machinery after infection.

870. Which statement is wrong for viruses?
(a) They have ability to synthesize nucleic acids and proteins
(b) Antibiotics have no effect on them
(c) All are parasites
(d) All of them have helical symmetry

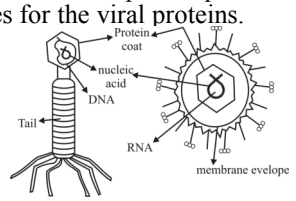
AIPMT (Screening)-2012

Ans. (d) : "All of them have helical symmetry" this statement is incorrect. While some viruses do have helical symmetry, not all viruses do have.
• Some viruses have icosahedral symmetry, while other have complex shapes.
• All virus are either plant or animal pathogen and have ability to synthesize nucleic acids and protein, showing all phenomenon like replication, transcription, reverse transcription and translation.
• Antibiotic are chemical compounds that act against the bacteria not virus.

871. Nucleic acid in HIV
(a) ss RNA (b) ds RNA
(c) ss DNA (d) ds DNA

AIPMT-1998

Ans. (a) : Nucleic acid in HIV (Human immunodeficiency virus) is single stranded RNA.
• The HIV is a lentivirus that causes HIV infection.
• It is composed of two copies of positive single stranded RNA that codes for the viral proteins.



872. Lichens can be used as
(a) Bio-indicator for water and air pollution
(b) Initial vegetation for waste lands
(c) Source of wood
(d) To check the air pollution

AIPMT-1999

Ans. (a) : Lichens are hypersensitive to sulphur dioxide pollution in the air because their efficient absorption system result in rapid accumulation of sulphur when exposed to high levels of sulphur dioxide pollution.
- Lichens are widely used as environmental indicators or bio-indicators.
- If air is very severely polluted with sulphur dioxide there may be no lichens present.
- If the air is clean, shrubby, hairy and leafy lichens become abundant.

873. Cauliflower mosaic virus contains : -
(a) ss RNA (b) ds RNA
(c) ds DNA (d) ss DNA

AIPMT-2001

Ans. (c) : Cauliflower mosaic virus (CaMV) is a member of the viruses which infect many plants especially the member of Cruciferae.
Cauliflower mosaic virus (CaMV) is an unusual plant virus which has a small genome of double-stranded DNA.

874. The latest view for the origin of viruses is
(a) these have arisen from nucleic acid and protein found in primitive soup
(b) these arise from bacteria as a result of the loss of cell wall, ribosome, etc
(c) these arise from some bacteria, which had developed a nucleus only
(d) these are modified plasmids, which are infact the fragments of the nucleic acids of the host

AP EAMCET-2011

Ans. (d) : Virus evolved from plasmids when pieces of DNA moved between cells. Many scientists believe that viruses are modified plasmids, which are the fragments of the nucleic acids of the host.

875. The agents which are known to cause CJD are
(a) A class of bacteria (b) A class of viruses
(c) Fungi (d) Protein particles

Karnataka CET-2009

Ans. (d) : Creutzfeldt- Jakob disease (CJD) is caused by prion protein is an invariably fatal degenerative brain disorder. Protein are molecules made up of amino acids that help the cells in our body function.
They are infectious and may cause severe problems including memory loss, impairment in sensory receptors etc.

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876. Which part of animal virus is not reproduced in multiple copies?
(a) Capsid (b) Proteins
(c) Envelops (d) Ribosome
JIPMER-2014

Ans. (d) : Ribosome of animal virus is not reproduced in multiple copies because they uses its host cell ribosomes for its protein synthesis.

877. What is the total number of amino acids when the capsid of TMV contains 2130 capsomers?
(a) 336540 (b) 162622
(c) 948 (d) 387921
AP EAMCET-2013

Ans. (a): Tobacco mosaic virus has a rod-like appearance. Its capsids are made of 2130 molecule of coat protein and one molecule of singles strand RNA which is 6400 bases long. The protein monomer consists of 158 amino acids which are assembled into four main alpha helices which are joined by a prominent loop proximal to the axis of the virion. So, the total number of the amino acids is $2130 \times 158 = 336540$.

878. The following statements are associated with connecting link between living and non-living. Choose correct statement regarding them.
(a) These are associated with harmful and useful activities
(b) These are extensively used in recombinant DNA technology
(c) They possess usually RNA as genetic material
(d) They cause diseases in both plant and animals, however its protein coat does not take part in infective process
UP CPMT-2014

Ans. (d): Viruses are connecting link between living and non-living. Viruses are disease causing organisms in both plant and animals. These are not associated with any useful activities and posses either DNA or RNA as genetic material. However during infection their protein coat remain inactive.

879. Who discovered cyanophages?
(a) Shafferman and Morris (b) Stanier
(c) Hershey and Chase (d) None of the above
UP CPMT-2014

Ans. (a): Cyanophages were discovered by **Shafferman** and **Morris** in *Plectonema boryanum*.
- **Hershey** and **Chase** proved unequivocally that DNA is a genetic material.
- Roger Stanier was a Canadian microbiologist who gave contributions to the taxonomy of bacteria and blue green algae or cyanobacteria.

880. Identify the correct pair of events when temperate phages infect bacteria.
(i) No prophages are formed
(ii) Bacterial cell undergoes many divisions
(iii) Bacterial cell undergoes immediate lysis
(iv) Prophages are formed
The correct pair is
(a) (i), (ii) (b) (ii), (iii)
(c) (iii), (iv) (d) (ii), (iv)
AP EAMCET-2009

Ans. (d) : Temperate phages possess the ability to go through a lysogenic cycle, entering the host cell. Temperate phages are the avirulent lysogenic phages, whose nucleic acids get incorporated in the bacterial DNA (lysogenization).When these phage infect bacteria, the bacterial cell undergoes several divisions and prophages are formed .

881. The virus, that infects bacteria, are made up of:
(a) Protein only (b) RNA and protein
(c) DNA and lipid (d) DNA and protein
WB JEE-2006

Ans. (d) : The virus, that infects bacteria, are made up of DNA and protein. A bacteriophages is a type of virus that infects bacteria. In fact, the word "bacteriophages" literally means "bacteria eater" because bacteriophages destroy their host cells. All bacteriophages are composed of a nucleic acid molecule that is surrounded by a protein structure.
• Viruses are bundle of nucleic acid DNA or RNA that are enclosed by a protein shell known as a capsid.

882. Provirus is
(a) a free virus (b) primitive virus
(c) integrated viral genome (d) a free DNA
JCECE-2008

Ans. (c) : Integrated viral DNA is referred to as a provirus in the case of retroviruses or prophage. The integrated viral genome does not necessarily make new DNA copies of it self while integrated into a host genome for example, when HIV enters a host CD4 cell, HIV RNA is first changed to HIV DNA (provirus).

883. A lichen responsible for forest fire is
(a) Lecanora (b) Usnea
(c) Cladonia (d) Ramalina
BVP-2010

Ans. (b) : A lichen responsible for forest fire is Usnea. Usnea get dry & become highly inflammable. It is also known as old man's beard is highly inflammable & hence is known to be responsible for forest fires.

884. Virus is classified in which of the following class?
(a) Akaryota (b) Prokaryota
(c) Eukaryota (d) None of the above
Rajasthan PMT-1996

Ans. (a) : All viruses are kept under akaryota. It includes organism having no cells. The thallophyta are a polyphyletic group of non-mobile organisms traditionally described as "thalloid plants". Prokaryotes are single-celled organism. Whereas Eukaryotes includes all animals, plants, fungi and many unicellular organism.

885. The protein that reproduce within the living cells are termed as
(a) plasmids (b) phages
(c) prions (d) prophages
MGIMS Wardha-2014

Ans. (c) : The protein that reproduce within the living cells are termed as prions. It refers to the proteins which are abnormally folded. They mainly causes disease in animals such as–
Bovine Spongiform Encephalopathy (BSE) or mad cow disease in cattle and Creutzfeldt-Jakob disease (CJD) in humans.

886. Helical contractile sheath is found in
(a) virus (b) bacterium
(c) fungus (d) bacteriophage
Manipal-2011

Ans. (d) : Helical contractile sheath is found in bacteriophage tail. It is attached to one end of the head

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axis. The tail consists of an inner hollow tube which is surrounded by a contractile sheath with 24 annular rings. The distal end consists of a basal plate with tail fibres at each corner. The bacteriophage attaches to the bacteria with the help of these tail fibres.

887. Lichens (1) are indicators of pollution (2) are also used in cosmetics (3) play important role in formation of soil (4) are algal and bacterial partners
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2011

Ans. (a) : Lichen is indicator of SO_2 pollution. They are also used in cosmetics and play important role in soil formation. They show mutualism because it supports both the fungi and the photosynthetic organism called photobionts, algae, cyanobacterium or green alga.

888. The common phycobiont of lichens is
(a) Trebouxia (b) Microcystis
(c) Euglena (d) Fucus
BHU PMT (Mains)-2011

Ans. (a) : The common phycobiont of lichens is Trebouxia. The algal component of lichen is called as phycobiont. Trebouxia is a unicellular green alga. It can either live in a symbiotic relationship with fungi in the form of lichen or it can survive independently as a free-living organism.

889. The process which cannot takes place in the absence of virus is:
(a) translocation (b) transduction
(c) transformation (d) conjugation
Karnataka CET-2002

Ans. (b) : The process which cannot takes place in the absence of virus is transduction. It is the process by which a virus transfer genetic material from one bacterium to another.

890. Polio is caused by a
(a) bacteriophage
(b) virus with a single-stranded RNA
(c) virus with a single-stranded DNA
(d) virus with double-stranded DNA
DUMET-2010

Ans. (b) : Polio is caused by a virus with a single-stranded RNA.
Polio virus is a virus which causes poliomyelitis disease and this disease is life threatening. This virus spreads from person to person which can affect the spinal cord which can cause paralysis.

891. The number of linkage group(s) present in *Escherichia coli* is
(a) one (b) two
(c) four (d) seven
DUMET-2010

Ans. (a) : The number of linkage group(s) present in *Escherichia coli* is one. It is a type of bacteria that generally lives in intestines and found in the gut of animals.

892. Rabies is caused by
(a) Virus (b) bacteria
(c) Protozoa (d) All of these
DUMET-2008

Ans. (a) : Rabies is caused by virus. It is transmitted if an infected animal bites a human or other animal.
The symptoms of rabies are uncontrolled excitement, hydrophobia, loss of consciousness and confusions.

893. Small proteins produced by vertebrate cells naturally in response to viral infections and which inhibit multiplication of viruses are called
(a) immunoglobulin's (b) interferons
(c) antitoxins (d) lipoproteins
AFMC-2007

Ans. (b) : Small proteins produced by vertebrate cells naturally in response to viral infections and which inhibit multiplication of viruses are called interferons. It helps the body's immune system to fight against infection and other diseases like cancer.

894. Viruses that infect bacteria multiply and cause their lysis, are called
(a) lysozymes (b) lipolytic
(c) lytic (d) lysogenic
Rajasthan PMT-2010

Ans. (c) : Viruses that infect bacteria, multiply and cause their lysis are called lytic cycle. It involves the reproduction of virus that uses a host cell to form more viruses and then the viruses burst out of the cell. Lytic cycle is commonly called reproductive cycle of bacteriophage. It is a 6-stage cycle-attachment, penetration, transcription, biosynthesis, maturation and lysis.

895. Animals virus contains mostly
(a) RNA (b) DNA
(c) RNA or DNA (d) Both (a) and (b)
AMU-2011

Ans. (b) : An animal virus is a small infectious agent that is unable to replicate outside a living animal cell. It contains only one kind of nucleic acid, either DNA or RNA but mostly contains DNA.

896. What is the genetic material in influenza virus?
(a) single-helix DNA (b) Double-helix DNA
(c) RNA (d) None of these
AMU-2011

Ans. (c) : Single stranded RNA is the genetic material in influenza virus. The RNA genes of influenza viruses are made up of chains of nucleotides that are bonded together with adenine, cytosine, guanine and uracil respectively.

897. Gemini viruses are plant viruses with
(a) Circular single stranded RNA
(b) Circular single stranded DNA
(c) Linear single stranded DNA
(d) Linear single stranded RNA.
AMU-1998

Ans. (b) : Gemini viruses are a family of plant viruses that cause economically important plant diseases worldwide. These viruses have circular single stranded DNA genomes and four to eight genes that are expressed from both strands of the double - stranded DNA replicative intermediate.

898. Bacteriophage is consist of :
(a) only proteins (b) nucleoproteins
(c) protein and lipid (d) only DNA
Rajasthan PMT-1998

Ans. (b) : Bacteriophages (viruses that infect the bacteria) are usually double stranded DNA viruses. The protein coat called capsid made of small subunits called capsomeres, protects the nucleic acid. The size and shape of capsomere vary in different species. It consists of a polyhedral head and tail.

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899. Which of the following statement is correct?
(a) Viruses are obligate parasites
(b) All fungi are pathogenic
(c) All algae are eukaryotes
(d) Bacteria are always harmful to mankind
CG PMT-2009/ Haryana PMT-2009 / WB JEE-2006

Ans. (a) : The term obligate indicates some types of restriction in an organisms way of life from which it cannot depart and survive.
Ex. A virus and its host.
Viruses are obligate parasites because they cannot multiply or grow outside the host cells.

900. The virus which causes ring spot diseases in cherry is transmitted through:
(a) seeds (b) fungi
(c) insects (d) pollen grains
AP EAMCET-2001

Ans. (d) : Prunus necrotic ringspot virus (PNRSV) is a plant pathogenic virus causing ring spot diesease affecting species of the genus Prunus. The virus also has been shown to infect and transmit through pollen and seeds. PNRSV has been show to be transmitted by bees carrying infected pollen into orchards. The virus infect all seed parts, therefore infection of seed can occur from an infected pollen grain, ovule or both.

901. Fungus/lichens which grow on wood is:
(a) terricolous (b) saxicolous
(c) lignicolous (d) corticolous
AFMC-2004

Ans. (c) : The lichens grow in different habitats. They grow on rocks, bark, wood and soil. The lichens that grow on wood is called lignicolous.
- Terricolous are the lichens that grow on soil.
- Saxicolous are the lichens that grow on rocks.
- Corticolous are the lichens that grow on bark.

902. Basic structure of protein was given by:
(a) W.M Stanley (b) Nicholson
(c) Watson (d) F. Sanger
AFMC-2004

Ans. (d) : F. Sanger won his first nobel prize for chemistry in 1958 for his work on the structure of proteins. F. Sanger first time deciphered the sequence of amino acids in a protein, i.e. bovine insulin. Proteins are made up of amino acids and amino acids are held together by peptide bonds.

903. The smallest organisms, which cause disease among plant are
(a) viruses (b) fungi
(c) mycoplasma (d) bacteria
CG PMT-2006

Ans. (c) : Diseases in plants occurs quite frequently and are most caused by pathogens. Pathogens include bacteria, fungi, viruses, mycoplasma, protozoans, nematodes. Among them the smallest organism is mycoplasma.
- Mycoplasma is the smallest prokaryotic organism that is capable of independent growth, division and reproduction. Its diameter is 0.0001 mm.

904. Virus multiplies in:
(a) soil (b) dead tissue
(c) living tissue (d) culture medium
BHU-PMT (Screening)-2008 /Uttarakhand PMT-2008
BHU PMT-2004

Ans. (c) : Viruses are tiny infectious agents that rely on living tissue to multiply. They may use an animal, plant or bacteria host to survive and reproduce. They can only multiply inside the living cells of host by using host's cellular machinery. As such, there is some debate as to whether or not viruses should be considered living organisms.

905. Smallest animal virus is
(a) pox virus (b) coliphage
(c) rhino virus (d) polio virus
BHU PMT (Screening)-2011

Ans. (d) : Virus is a pathogen particle that can cause various disease. Smallest virus belongs to the family Picornaviridae. It is about 20-30nm in size. They have limited genetic information on them. Polio virus belongs to this family. It is the causative agent of polio. The virus enters the body through the mouth or can be spread through the stool of the infected person. Polio can be prevented by proper vaccination given to the children at an early age.

906. Potato spindle tuber disease is caused by
(a) a nematode (b) a virus
(c) a bacterium (d) a viroid
DUMET-2009

Ans. (d) : Viroids are the smallest infectious pathogens which are composed of circular single - stranded RNA without a protien coat. Viroid is a infectious agent that is smaller than viruses and cause potato spindle tuber disease. The first viroid to be described was potato spindle tuber viroid

907. Which one of the following are intracellular obligate parasites?
(a) Bacteria (b) Viruses
(c) Slime moulds (d) Blue-green algae
DUMET-2009

Ans. (b) : Viruses are non- cellular, infectious, intracellular, obligate parasites because they cannot multiply or grow outside the host cells.

908. Identify the correct pair that shows the double stranded RNA among the following
(a) Cauliflower mosaic virus and Dahlia mosaic virus
(b) Poliovirus and wound tumour virus
(c) Wound tumour virus and reovirus
(d) Tobacoo mosaic virus and reovirus
VMMC-2010

Ans. (c) : Wound tumour virus belongs to the genus phytoreovirus and the family reoviridae.
Wound tumour virus has a double- stranded RNA genome which is approximately 25,000 base pairs long and organised into twelve segments. The genome of Reovirus contain 10-12 segments of double stranded RNA.
- Polio virus contains ssRNA genome.
- Cauliflower mosaic virus has a circular dsDNA molecule.
- Dahlia mosaic virus has double-stranded DNA genome.
- Tobacco mosaic virus has ssRNA genome .

909. Bio-indicators are used for
(a) oxygen demand (b) air pollution
(c) mineral present (d) All of the above
Haryana PMT-2008

Ans. (d) : Bioindicators are those species which can reveal the status of the quality of the air of the environment. Thus, they are indicators of environmental health. Oxygen demand, presence of minerals,

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occurence of petroleum products, radioactive minerals and pollution etc. are some of the responses that can be detected using bioindicators.

910. Interferons are synthesized in response to:
(a) bacteria (b) viruses
(c) fungi (d) mycoplasma
Haryana PMT-2003

Ans. (b) : Interferon is synthesized in response to the virus. Interferons are mostly secreted by virus infected cells to protect the adjacent cell from viral infection.
Interferons interfere with the replication of viruses thus they are commonly known as antiviral agent.
Interferons are from the family of cytokines or protein hormones and these molecules are used for triggering the immune system's protective defense mechanisms as they can communicate cell to cell and eradicate pathogens.

911. Which pair of disease is viral?
(a) AIDS, Rabies (b) Typhoid, Tetanus
(c) Rabies, Syphilis (d) Cholera, T.B.
Haryana PMT-2003

Ans. (a) : Rabies (hydrophobia) is caused by a virus named as rabies virus. Rabies virus is a type of rhabdovirus. AIDS is caused by a virus named as HIV. HIV is a virus that attacks the body's immune system. HIV is a genus of family Retroviridae.
• Typhoid, Tetanus, Syphilis, Cholera, T.B. all are bacterial diseases caused by different bacteria.

912. T series bacteriophage possess complex tail structure is
(a) T_1 (b) T_2
(c) T_3 (d) T_4
CG PMT-2010

Ans. (d) : Bacteriophage T4 consist of a head for protecting its genome and a sheathed tail for inserting its genome into a host.
Bacteriophage T4 has a tail sheath that is composed of 138 copies of gene product (gp)18. The tail tube inside the sheath is estimated to be assembled from as many (gp)19 subunits as there are (gp)18 subunits in the sheath. The mature phage has a 1150Å - long and 850 Å wide prolate head, which encapsidates the genome.

913. A virus that can reproduce without killing its host is called a
(a) Lyric virus (b) Retroactive virus
(c) Temperate virus (d) Virion
CG PMT-2010

Ans. (c) : It only consists of its genome that may or may not is encapsulated in a protein coat. A virus that can reproduce without killing its host is called a temperate virus. Temperate virus is a virus which upon infection of a host. It does not necessarily causes lysis but its genome may replicate in synchrony with that of the host.

914. Who is credited to show that Viruses are the cause of cancer?
(a) GJ Mendel (b) HG Khorana
(c) MS Swaminathan (d) Dulbecco
CMC Vellore-2014

Ans. (d) : Renato Dulbecco was an Italian virologist, who won the 1975 Nobel Prize in Physiology or Medicine for his work on oncoviruses which are viruses that can cause cancer when they infect animal cells.
• When viruses highjack host cell and insert their own DNA or RNA into the host cell, this can cause the host cells to become cancerous.

915. Virus cause swollen shoot disease in:
(a) tomato (b) brinjal
(c) potato (d) cocoa
AP EAMCET-1999

Ans. (d) : Swollen shoot is a viral disease transmitted to the plant by mealybugs that has devastated Ghanaian and Nigreian cocoa crops.
The CSSVD is caused by a badnavirus within the family caulimoviridae. It is transmitted by infectious mealybugs.

916. Tobacco mosaic virus is a tubular filament of size
(a) 300 × 20 nm (b) 700 × 30 nm
(c) 300 × 10 nm (d) 300 × 5 nm
VMMC-2007

Ans. (a) : The TMV has a rod like appearance that is 300 nm long with a diameter of 20nm. TMV is a ssRNA virus, that is the causative agent of mosaic in tobacco and other members of the Solanaceae.

917. Which has double-stranded RNA?
(a) Cauliflower mosaic virus (b) TMV
(c) $\phi \times 174$ (d) Reovirus
(e) None of the above
CMC Vellore-2010

Ans. (d) : Reovirus is a double - stranded RNA virus that infects mammals , birds and reptiles.
Reovirus belongs to the family Reoviridae. The genome of viruses in Reoviridae contain 10-12 segments of double stranded RNA.
• Cauliflower mosaic virus contains dsDNA molecule.
• TMV is a ssRNA virus.
• $\phi \times 174$ is a ssDNA virus.

918. Viruses that infect bacteria, multiply and cause their lysis are
(a) lysozymes (b) lipolytic
(c) lytic (d) lysogenic
CMC Ludhiana-2012

Ans. (c) : The lytic cycle involves the reproduction of viruses using a host cell to manufacture more viruses, the viruses then burst out of the cell. The lytic phase of bacteriophages (Virus that infects bacteria) includes multiplications of viral particles followed by the disruption of the host cell to the release the virion
The lysogenic cycle involves the incorporation of the viral genome into the host cell genome, infecting it from within. Viruses that infect bacteria, multiply and cause their lysis are called lytic.

919. Plant viruses contain
(a) DNA (b) RNA
(c) Both (a) and (b) (d) Plasmids
AMU-2003

Ans. (b) : Most virus that infect plants use RNA to carry their genomic information. Generally plant virus are single stranded RNA virus. However, the majority of plant virus do not use DNA at all.

920. Litmus is obtained from :
(a) Rocella montagnei (b) Lasallia postillalata
(c) both (a) and (b) (d) Cladonia crispate
Haryana PMT-2005

Ans. (c) : Litmus is a dye obtained from various species of lichen e.g. *Rocella montagnei, Lasallia postillalata* etc.

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03 PLANT KINGDOM

A. Basic Classification of Plant

1. Which of the following is/are grouped under phanerogams?

(a) Angiosperms (b) Gymnosperms
(c) Pteridophytes (d) Both (a) and (b)

VMMC-2012, 2002
JIPMER-2009
CG PMT-2008
Uttarakhand PMT-2008
BVP-2007
BHU PMT-2004

Ans. (d) : Phanerogams are also known as seed-producing plants, as they have special reproductive organs that produce seeds.

2. Linnaeus system of plant classification is based on

(a) morphological and anatomical characters
(b) evolutionary trends
(c) floral characters
(d) None of the above

Rajasthan PMT-2009
CMC Vellore-2009
Punjab MET-2009
UP CPMT-2009

Ans. (c) : Linnaeus System of plant classification is based on floral character. Floral characters were preferred because the floral characters are less affected by environment than the vegetative parts.

3. Natural system of classification proposed in

(a) Families of Flowering plants
(b) Historial plantarum
(c) Genera plantarum
(d) Species plantarum

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Natural system of clasification is prposed by benthom and Hooker in 1887 to 1911 the discribe the clasification on his book Genera platarum.

4. Match the three columns and identify the correct combination

Group-I		Group-II		Group-III	
1.	Puccinia	P.	White spots in Brassica	X.	Basidiomycetes
2.	Alternaria	Q.	Leaf rust in Wheat	Y.	Phycomycetes
3.	Albugo	R.	Early Blight in potato	Z.	Deuteromycetes

(a) 1 – R – X, 2 – Q – Z, 3 – P – Y
(b) 1 – Q – X, 2 – R – Z, 3 – P – Y
(c) 1 – Q – Z, 2 – P – X, 3 – R – Y
(d) 1 – Q – Y, 2 – R – X, 3 – P – Z

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : Puccinia– It is a fungus which belongs to Basidiomycetes class. Puccinia is a heteroecious fungus i.e., it requires two different hosts for completing their life cycles. The Rust of wheat is caused by the fungus-*Puccinia graminis*.
Alternaria– It belongs to Deuteromycetes class of fungi, commonly known as imperfecti fungi because only the asexual or vegetative phases of these fungi are known.
Early blight of potato is caused by these fungus-*Alterneria soleni*, which can cause disease in potato, tomato other members of the potato family.
Albugo– This fungus is belongs to phycomycetes class. Members of phycomycetes are found in aquatic habitats and on decaying wood in moist places or as obligate parasite on plant.
White spots in Brassica is caused by the fungus-*Albugo candida*. It affects many brassica crops including broccoli and cauliflower and some brassica weeds.

5. Four plants are observed 'A' is a primitive land plant. 'B' is embryophytic archegoniate phanerogam. 'C' is autotrophic thallophyte showing haplontic lifecycle. 'D' is nonflowering plant with heterosporous sporangium. The plants found respectively are

(a) Spirogyra, Mucor, Funaria, Cycas
(b) Marchantia, Ginkgo, Spirogyra, Selaginella
(c) Marchantia, Cycas, Laminaria, Sphagnum
(d) Volvox, Pinus, Funaria, Salvinia

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : • Marchantia is a primitive land plant, it is a member of Bryophyta.
• Ginkgo is a embryophytic archegoniate phanerogam, which is a gymnaspormic plant.
• Spirogyra is a autotrophic thallophyte showing haplontic life cycle.
• Selaginella is a non flowering plant with heterosporous sporangium, it is a pteridophytes.

6. Choose the correct answer from the following:
A student identified three xerophytes A, B and C consisting of succulent leaf, succulent stem tuberous root, respectively.
Identify those plants in the same order.

(a) Aloe, Opuntia and Asparagus
(b) Opuntia, Aloe and Asparagus
(c) Aloe, Asparagus and Opuntia
(d) Asparagus, Aloe and Opuntia

TS EAMCET-31.07.2022 Shift-II

Ans. (a) : Aloe, Opuntia and Asparagus plants in the same order. Aloevera is a sacculent that can be grown indoors as a house plants. The leaves may tend to drop when placed in a low light setting. Aloevera is grown by for the gel in the leaves. A low - spreading cactus species, opuntia basilaris is a bushy sacculent shrub with grey, blue. Tuberous root are found in number of plants inducing Asparagus, Dahlia, sweet potato etc. In these plants, swollen roots form at or near the base of the original plant.

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7. Benthem & Hooker divided the following plants into 3 classes which includes _____

(a) Dicotyledonae, Angiospermae, Monocotyledonae
(b) Dicotyledonae, Gymnospermae, Monocotyledonae
(c) Pteridophyta, Bryophyta, Angiospremae
(d) Bryophyta, Pteridophyta, Gymnospermae

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Benthem and Hooker gave the natural system of classification and it is based on important characteristics of the plant. The outline of Bentham and Hooker's classification is, "The seeded plants are divided into three classes- Dicotyledonae, Gymnospermae and Monocotyledonae.

8. One of the following scientists was the earliest to attempt more scientific basis for classification ————

(a) Linnaeus (b) Theophrastus
(c) Aristotle (d) Whittaker

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : The first person to try a more rational basis for classification was Aristotle. He divided plants into trees, shrubs, and herbs using straight forward morphological characteristics. Additionally he separated animals into two categories. Those with red blood and those without.

9. Choose the incorrect statement among the following.

(a) Any unit in the classification is called Taxon
(b) System of classification based on the evolutionary relationship is called phylogenetic system
(c) Development of fruit in the soils called geocarpic as in Arachis
(d) Theophrastus classified plants based on floral characters

TS EAMCET-10.08.2021 Shift-I

Ans. (d) : Theophrastus (370-287 BC) was a Greek naturalist and pupil of Plato and Aristotle
Based on the habit, the classified the plants into
Four (4) groups:
(1) Herbs
(2) Under shrubs
(3) Shrubs
(4) Trees
System of classification based on the evolutionary relationship is called phylogentic system.
Development of fruit in the soil called geocarpic. It is present in arachis.

10. The book 'Die Naturlichen Pflanzen familien' was written by_____

(a) J. Hutchinson
(b) Engler and Prantl
(c) Bentham and Hooker
(d) Theophrastus

AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Engler and Prantl its collaborator Karl prantl carried out a monograph. "Die". Naturlichen pflanzen familien" on a twenty volume basis covering all the recognized genera of plants from algae to phanerogams, as well as the key for plant identification.
And published - 1887- 1915
Language - German.

11. Which one of the following books were contributed by Linnaeus?

(a) Historia Plantarum (b) Systema Naturae
(c) Historia Naturalis (d) Genus Naturae

AP EAMCET-05.10.2021 Shift-I
BCECE-2012

Ans. (b) : As the foundation for linear taxonomy, Swedish botanist, Scientist and Physician Carolus Linneaus introduced a book of bionomial nomenclature. The word systematics is derived from latin word 'systema' which means systematic arrangement of organism, Linnaeus used systema naturae as the title of his publication.

12. Assertion (A) : Socrates, Plato and Aristotle were responsible for the development of Botany into a science.
Reason (R) : They are regarded as Father of Botany.
The correct option among the following is
Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : Theophrastus is regarded as the father of botany as he could explain various plant processes. Aristotle is regarded as the father of zoology.
The father of modern Botany is Carolus Linnaeus. He is also known as the father of taxonomy.

13. In which of the following books, characters of evolutionary importance were not considered while classifying plants?

(A) Species plantarum
(B) Families of flowering plants
(C) Genera Plantarum
(D) Die Naturlichen pflanzen familien
The correct answer is
Options:

(a) A, D only (b) B, C only
(c) B, D only (d) A, C only

TS EAMCET-28.09.2020 Shift-I

Ans. (d) : Speices plantarum two volume work by botanist Carolus Linnaeus in which he established a precise and workable two work or binomial, system for naming plants. This system forms the basis of modern plant taxonomy and genera plantarum's first edition includes brief descriptions of the 935 Genera of plants known to linnaeus at the time.

14. Match the following lists:

List -I	List - II
(A) Protonema	**I. Useful in spore dispersal**
(B) Circinate vernation young	**II. Coiling of leaves in Pteridophytes**
(C) Elaters	**III. Storage food in Rhodophyceae**
(D) Floridean starch of	**IV. Juvenile stage Bryophytes**
	V. Naked ovules

The correct match is

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Options:

	A	B	C	D
(a)	IV	II	I	III
(b)	IV	II	III	V
(c)	I	II	IV	III
(d)	II	IV	V	I

TS EAMCET-28.09.2020 Shift-I

Ans. (a) :

List-I	-	List-II
(A) Protonema	-	Juvenile stage Bryophytes
(B) Circinate	-	coiling of leaves in pteridophytes
(C) Elaters	-	Useful in spore dispersal
(D) Floridean starch of	-	Storage food in Rhodophyceae

15. New systematics introduced by Sir Julian Huxley is also called _____

(a) Phenetics
(b) Biosystematics
(c) Cladistics
(d) Numerical Taxonomy

AP EAMCET-25.09.2020 Shift-I

Ans. (b) : New systematics introduced by Sir Julian Huxley is also called biosystematics. The notion of systematic known as new systematic or biosystematic identifies taxonomic affinities bassed on morphological, genetic and evolutionary features. Cladistics or phylogenetic classification produced by new systematic.

16. Match the following books with their authors:

	Column-I		Column-II
1.	Families of flowering plants	i.	Species plantarum
2.	Linnaeus	ii.	Historia plantarum
3.	Bentham & Hooker	iii.	Hutchinson
4.	Theophrastus	iv.	Genera plantarum

(a) (1 – ii), (2 – iii), (3 – i), (4 – iv)
(b) (1 – i), (2 – iii), (3 – ii), (4 – iv)
(c) (1 – iii), (2 – i), (3 – iv), (4 – ii)
(d) (1 – iv), (2 – iii), (3 – ii), (4 – i)

AP EAMCET-25.09.2020 Shift-I

Ans. (c) :

Column-I	Column-II
(1) Families of flowering plant, volume - I (1926) & II volume-II (1934)	Hutchinson
(2) Linnaeus	Species plantarum (1753)
(3) Bentham and Hooker	Genera plantarum (1862)
(4) Theophrastus	Historia plantarum

17. Floral characters such as single whorl of perianth or no perianth and unisexual flowers pollinated by wind were considered as primitive characters in _____system of classification

(a) Natural (b) Artificial
(c) Phylogenetic (d) Botanical

SRM JEEE-2019

Ans. (c) : Floral characters such as single whorl of perianth or no perianth and unisexual flowers pollinated by wind were considered primitive characters in the phylogenetic system of classification.
A phylogenetic tree, also called an evolutionary tree, is a tree showing the evolutionary relationships among various biological species or other entities that are believed to have a common ancestor.

18. Match Column - I with Column - II

Column - I		Column - II
A. Saprophyte	**i.**	**Symbiotic association of fungi with plant roots**
B. Parasite	**ii.**	**Decomposition of dead organic materials**
C. Lichens	**iii.**	**Grow on living plants or animals**
D. Mycorrhiza	**iv.**	**Symbiotic association of algae and fungi**

Choose the correct answer from the option given below

	A	B	C	D
(a)	(iii)	(ii)	(i)	(iv)
(b)	(ii)	(i)	(iii)	(iv)
(c)	(ii)	(iii)	(iv)	(i)
(d)	(i)	(ii)	(iii)	(iv)

NEET-2019

Ans. (c) : • Decomposition of dead organic materials is know as saprophyte.
• Grow on/in living plants & animals is called as parasite.
• Symbiotic association of algae and fungi is called as Lichens
• Symbiotic association of fungi with roots of higher plant is called as Mycorrhiza.

19. Match the following lists:

List I		List II	
A.	**C.G.K. Ramanujam**	**(i)**	**de Historia plantarum**
B.	**Sutton and Boveri**	**(ii)**	**Palynology**
C.	**Theophrastus**	**(iii)**	**sexual sytem of classification**
D.	**Carolus Von Linnaeus**	**(iv)**	**sexual reproduction in plants**
		(v)	**chromosome theory of inheritance**

The correct answer is

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(ii)	(v)	(i)	(iv)
(c)	(ii)	(v)	(iii)	(i)
(d)	(ii)	(v)	(i)	(iii)

TS EAMCET-02.05.2018 Shift-II

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Ans. (d) :

C.G.K. Ramanujan	–	Palynology
Sutton and Boveri	–	Chromosome theory of inheritance
Theophrastus	–	de-Historia plantarum
Carolus von Linnaeus	–	Sexual system of classification

20. Identify the wrong combination

(a) Dryopteris — Rhizome
(b) Cycas — Coralloid roots
(c) Volvox — Colonial form
(d) Marchantia — Pseudoelaters

JIPMER-2017

Ans. (d) : The bryophyte marchantia is a member of the Hepapticopsida, a group of liverworts they have hygroscopic elasters, which form inside the capsule along with the spores. Elasters aid in the dehiscence of the capsule and spore release. Dryopteris is a terrestrial fern. In cycas, coralloid root is present. Volvox is a green algae.

21. Match the storage products listed under column I with the organism given under column II. Choose the appropriate option from the given options

Column I	Column II
A. Glycogen	1. Sargassum
B. Pyrenoids	2. Nostoc
C. Laminarin and mannitol	3. Polysiphonia
D. Floridean starch	4. Spirogyra 5. Agaricus

Codes

	A	B	C	D
(a)	3	4	1	5
(b)	4	3	5	2
(c)	5	4	1	3
(d)	2	1	4	3

JIPMER-2017

Ans. (c) :

(A) Glycogen → 5. Agaricus
(B) Pyrenoids → 4. Spirogyra
(C) Laminarin and Mannitol → 1. Sargassum
(D) Floridean Starch → 3. Polysiphonia

22. Which of the following is a merit in the Bentham and Hooker's system of classification?

(a) The position of Gymnosperm in between dicots and monocots
(b) Closely related families are placed apart
(c) The placement of family Asteraceae in the beginning of gamopetalae
(d) The placement of order Ranales in the beginning
(e) The placement of Orchidaceae in microspermae

Kerala PMT-2008

Ans. (d) : Bentham and Hooker propounded the system of seed plant classification which is the most well developed natural categorization. Their work was published in Genera plantarum in three volumes between 1862 to 1883 in Latin.
Hence, the placement of order Ranales in the beginning is a merit in Bentham and Hooker's system of classfication.

23. Assertion: Higher plant have meristematic region for indefinite growth.
Reason: Higher plants have root and shoot apices.
(A) If both (A) and (R) are true and the (R) is correct explanation of the (A).
(B) If both (A) and (R) are true but the (R) is not correct explanation of the (A).
(C) If the (A) is true but the (R) is false.
(D) If both the (A) and (R) are false.
(E) If (A) is false, but (R) is true.

(a) A (b) B
(c) C (d) D
(e) E

AIIMS-1999

Ans. (a) : Meristematic tissues are embryonic in origin. Higher plant have meristematic region for indefinite growth. It is mainly present in the shoot and root apices and is responsible for their continuous growth. Hence, (A) and (R) are true and the (R) is correct explanation of the (A).

24. In Bentham and Hooker's system of classification the sub-class polypetalae and Gamopetalae have the cohorts in the ratio of

(a) 3 : 2 (b) 1 : 1
(c) 2 : 1 (d) 2 : 3

AP EAMCET-2014

Ans. (b) : In Bentham and Hooker's system of classification the sub-class polypetalae and gamopetalae have the cohorts in the ratio of 1 : 1

25. Which one of the following statements is wrong?

(a) Agar - agar is obtained from Gelidium and Gracilaria
(b) Chlorella and Spirulina are used as space food
(c) Mannitol is stored food in Rhodophyceae
(d) Algin and carragen are products of algae

AIPMT-2015

Ans. (c) : Mannitol is stored food in fucus. They are grown algae which is found in intertidal zones of rocky seashores. Algae can reserve food in their body for their future requirements. Mannitol is a form of complex carbohydrates that is stored in fucus which belongs to phaeophyceae order.
In Rhodophyceae stored food material is floridean starch.
Hence, mannitol is stored food in Rhodophyceae is wrong statement.

26. Chromatophores take part in :

(a) Respiration (b) Photosynthesis
(c) Growth (d) Movement

AIPMT (Re-Exam)-2015

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Ans. (b) : Chromatophore are specialized cells which contains or produce pigment to give the colour to the organism or a specific part.
Chromatophores, found in some forms of photosynthetic Bacteria, contain bacteriochlorophyll pigments and carotenoids. They are mainly found in cold blooded animals like fish, amphibians, reptiles, crustacean and cephalopods.
They are used to match the brightness of the background. It helps the animals to achieve general resemblance.

27. Tracheophyta consists of
(a) bryophytes only
(b) pteridophytes only
(c) gymnosperms and angiosperms
(d) Both (b) and (c)

UP CPMT-2009

Ans. (d) : Tracheophyta consist of the plant with vascular tissue such as pteridophyta, gymnosperm and angiosperm.
They have dominant sporophytes phase with roots, stems and leaves, the sporophytes of tracheophytes is independent. Only angiosperm have vessels in the xylem for conduction of water and minerals.

28. Plants reproducing by spores such as mosses and ferns are grouped under the general term:-
(a) Cryptogams (b) Bryophytes
(c) Sporophytes (d) Thallophytes

AIPMT-2003

Ans. (a): A cryptogam is a plant or a plant like organism that reproduces by spores, without flowers or seeds. The name cryptogam means "hidden reproduction". All spores producing plants such as mosses and ferns, are known as cryptogams.

29. Organisms which obtain energy by the oxidation of reduced inorganic compounds are called
(a) Photo autotrophs
(b) Chemoautotrophs
(c) Saprozoic
(d) Coproheterotrophs

AIPMT-2002

Ans. (b) : The organisms which obtain energy by the oxidation of reduced inorganic compounds are called **chemoautotrophs**.
- **Photoautotrophs** make their food by photosynthesis using the energy of sun.
- **Saprozoic organism** obtain food from the dead and decaying matter.

30. Artificial system of classification was first used by
(a) Linnaeus
(b) De Candolle
(c) Pliny the Edler
(d) Bentham and Hooker

AIIMS-1999,1998
AIPMT-1989

Ans. (a) : Artificial system of classification is mainly based on morphological feature. This was first proposed by Carl Linnaeus.

31. Phylogenetic classification is one which is based on
(a) overall similarities
(b) utilitarian system
(c) habits of plants
(d) common evolutionary descent

AIPMT-1994

Ans. (d) : The phylogenetic classification is based on the evolutionary descent of a group of entities. Relationship are exhibited via a cladogram and a phylogram.

32. Identify the scientists worked extensively on chlorophyllous and non chlorophyllous thallophytes, respectively
i. Iyengar **ii. Swaminathan**
iii. Mehta **iv. Maheshwari**
(a) i, iv (b) i, iii
(c) ii, iii (d) iii, iv

AP EAMCET-2008

Ans. (b) : M.S. Swaminathan - M.S. Swaminathan, Indian geneticist and international administration, renowned for his leading role in Indian's **''Green revolution''.**
Iyengar and **Mehta** are scientists who worked extensively on chlorophyllous and non-chlorophyllous Thallophytes.
Maheshwari- Dr. Panchanan Maheshwari (9 November 1904-18 may 1966) was a prominent Indian botanist **(Father of Indian Embryologist)** noted Chiefly for his **invention of the technique of test tube fertilization of angiosperms.**
This invention has allowed the creation of new hybrid plants that could not previously be crossbreed naturally.

33. Which of the following is correctly matched without exception in regard to plant classification?
(a) Family – Poaceae - ae
(b) Division – Pteridophyta- Phyta
(c) Class – Bryopsida-sida
(d) Genus – Solanum - um

AIIMS-2013

Ans. (c) : For other plants we generally use the suffix "sida" while for class we use the suffix "phyceae" if we talk about the algae specifically.
Bryopsida is the largest class of Bryophyta with approx 1400 species. They are generally known as mossess. For example- Funaria, Sphagnum and Polytrichum.

34. Phytochrome is found in:
(a) bryophytes (b) pteridophytes
(c) angiosperms (d) all of these

AFMC-2003

Ans. (d) : Phytochrome mainly found in angiosperm (flowering plants).
It Phytochrome is a blue-green pigment present in plant and helps to detect light. It is found in many flowering plants, where it regulates the flowering time based on the length of day and night.

35. Father of botany is
(a) Linnaeus (b) Leeuwenhoek
(c) Theophrastus (d) Aristotle

Punjab MET-2008

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Ans. (c) : Father of Botony is Theophrastus. Theophrastus was a greek naturalist, who is called as the father of Botany was the pupil of the great philospher Plato and Aristotle. He classified the plants into four groups one the basis of their habit.
(I) Herbs,
(II) Under shrubs
(III) Shrubs
(IV) Trees.

36. A group of plants which are autotrophs, their sex organs are non-jacketed and whose zygotes secrete thick wall are called
(a) phycophytes (b) lichens
(c) bryophytes (d) thallophytes

Punjab MET-2007

Ans. (d) : The division of the plant kingdom known as thallophyta contains simple looking, early forms of plant life ranging from single celled to enormous algae, fungus and lichens. The term 'thallophytes' refers to the first ten phyla. They are straight forward plants without stalks, leaves, or roots. They don't include embryophyte.
A group of plants which are autotrophs, their sex organs are non-jacketed and whose zygotes secrete thick wall are called thallophytes.

37. Systema naturae is concerned with
(a) solar system
(b) ecosystem
(c) classification of plants and animals
(d) natural selection

CG PMT-2005

Ans. (c) : Systema Naturae is one of the famous book of zoologist Carolus linnaeus. It deals with classification of plants and animals.

38. Five kingdom classification includes:
(a) Monera, Protista, Fungi, Plantae, Animalia
(b) Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperms
(c) Virus, Prokaryote, Fungi, Plantae, Animalia
(d) Monera, Protista, Animalia, Plantae, Algae

DUMET-2006

Ans. (a) : Five kingdom classification includes monera, protista, fungi, plantae, Animalia. The first person who divided living things into five broad kingdoms, was north American Ecologist Robert Whittaker.

39. Phylogenetic system is based on:
(a) evolutionary and genetic character
(b) reproductive characters
(c) morphological characters
(d) natural affinities

DUMET-2006

Ans. (a) : Phylogenetic system is based on evolutionary and genetic character that display with help of DNA and RNA sequencing.

40. Consider the following statements. Select the false statement.
(a) Scientists who study and contribute to the classification of organisms are known as systematists
(b) Carolus Linnaeus developed the first scientific system of naming species
(c) A five kingdom arrangement of organisms was introduced by RH Whittaker
(d) Phycomycetes are called club fungi because of a club shaped end of Mycelium known as basidium
(e) None of the above

CMC Vellore-2015

Ans. (d) : The study of biological diversity and the interactions, between species is frequently referred to as systematic.
• Carolus Linnaeus developed the first scientific system of naming species known as binomial nomenclature.
• A five kingdom arrangement of organisms was introduced by RH Whittaker it divided into 5 - animalia, plantae, protista, fungi and monera.
• Phycomycetes are called algal fungi, Ascomycetes are sac fungi, basidimycetes are club fungi.

41. Match the words of Column I with that of Column II and choose the correct answer given below:

Column – I	**Column - II**
(A) Algae	**(P) Gymnosperms**
(B) Riccia	**(Q) Pond scum**
(C) Spirogyra	**(R) Autotrophic**
(D) Gnetum	**(S) Liverwort**

	(A)	**(B)**	**(C)**	**(D)**
(a)	(R)	(S)	(Q)	(P)
(b)	(P)	(S)	(Q)	(R)
(c)	(S)	(P)	(R)	(Q)
(d)	(R)	(Q)	(S)	(P)

Karnataka CET-2013

Ans. (a) : correct match:-

(A) Algae	-	(R) Autotrophic
(B) Riccia	-	(S) Liverwort
(C) Spirogyra	-	(Q) Pond scum
(D) Gnetum	-	(P) Gymnosperm

42. Mosses and ferns are
(a) Thallophytes of plant kingdom
(b) Angiosperms of plant kingdom
(c) Gymnosperms of plant kingdom
(d) Amphibians of plant kingdom

Karnataka CET-2013

Ans. (d) : Moss and ferns are called Amphibians of the plants kingdom because they can live in soil but need water to reproduce sexually. Archegonia is immobile so antherozoids are mobile and swim in water and fertilize with the egg of archegonia.

43. Who proposed the natural system of classification?
(a) Carolus Linnaeus
(b) John Hutchinson
(c) Bentham and Hooker
(d) Oswald Tippo

BVP-2011
DUMET-2003
AIPMT-1988

Ans. (c) : Bentham and Hooker proposed the natural system of classification. The first part of Genera plantarum appeared in July 1862 and last part in April 1883. Natural system of classfication is based on natural affinities among the plants and consider not only the external features but also the internal features.

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44. Oswald and Tippo has divided plant kingdom in to:
(a) two sub kingdoms (b) three sub kingdoms
(c) four sub kingdoms (d) five sub kingdoms
Rajasthan PMT-1997

Ans. (a) : Oswald and Tippo, classified plant kingdom into two sub-kingdom, thallophyta and embryophyta on the basis of absence and presence of an embryo, which was again divided into spermatophyta.

45. The basis of phenetic classification is
(a) sexual characteristic
(b) dendrogram based on DNA characteristic
(c) ancestral lineage of existing organisms
(d) observable characteristic of existing organisms
Manipal-2014

Ans. (d) : Phenetic classification of organism is based on observable characteristic of existing organism. Phenetics is an attempt to classify organisms on basis of overall similarity, usually by morphology or other observable traits, regardless of their phylogeny or evolutionary relation, observable characters refer to morphology and their traits that can be observed.

46. How many sub-phyla are present in tracheata according to Tippos classification of kingdom plantae?
(a) 3 (b) 6
(c) 4 (d) 5
Manipal-2001

Ans. (c) : There are 4 sub-phyla present in tracheata according to Tippos classification of kindgom plantae. psilopsida lycopsida, sphenopsida and pteropsida.

47. Botanical herbarium of India are classified according to classification of :
(a) Bentham and Hooker
(b) Hutchinson
(c) Engler and Prantl
(d) Bauhin
Rajasthan PMT-2001

Ans. (a) : Botanical Herbarium of India are classified according to classification of Bentham and Hooker.
Herbarium plant speciman are arranged according to Bentham and Hookers classification the majority considers the reproductive parts of the plants.

48. In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result
(a) There is no change in success rate of fertilization
(b) There is high degree of sterility
(c) One can conclude that the plant is apomictic
(d) Self-fertilization is prevented
BCECE-2012

Ans. (d) : Out breeding device when antherozoids and eggs mature at different time in plant, then it is known as out breeding device. As a result, self fertilization is prevented and cross fertilization occurs. The success rate of self fertilization decreases while that of cross fertilization increases. In the prothallus of a vascular cryptogenic plant, maturation of antherozoids & eggs mature at different times.

49. The division of the plant kingdom into Prokaryota and Eukaryota is based on the character of
(a) nucleus only (b) chromosomes only
(c) cell organelles only (d) All of the above
CG PMT-2004

Ans. (a) : The primary distinction between a prokaryotic cell & Eukaryotic cell is based on the nucleus. A cell having a pro or primitive nucleus is called as prokaryotic. 'Karyon' means nucleus.
In prokaryotic cell, membrane-bound cell organelles are absent. Prokaryotic cell are generally smaller and multiply more rapidly than eukaryotic cells.
The cells with well developed nucleus are called as Eukaryotic.

50. Order - Inferae belongs to
(a) Polypetalae (b) Gamopetalae
(c) Monochlamydae (d) None of these
BVP-2011

Ans. (b) : Order Inferae belong to gamopetalae, inferae means ovary is inferior and stamens are equal to the number of corolla lobes. These characteristics are found in Asteraceae family.

51. Archegonia are not found in
(a) bryophytes (b) pteridophytes
(c) gymnosperms (d) angiosperms
BVP-2011

Ans. (d) : Archegonia are not found in flowering plant that is Angiosperm. These are two reproductive structures in Angiosperm namely the Stamen or the Androecium, the male part which produce the pollen and the female part, which is called Gynoecium or the pistil.
Archegonia is present in thallophytes, bryophytes, pteridophytes and gymnosperms.

52. In which book, Bentham and Hooker proposed their classification?
(a) Genera Plantarum (b) Species Plantarum
(c) Historia Plantarum (d) Historia Naturae
WB JEE-2008

Ans. (a) : • Historia plantarum is written by Theophrastus.
• Species plantarum is written by botanist Carolus linnaeus.
• Historia naturae is written by Pling the Elder.
•The Natural system of classification is given by Bentham and Hooker. It is published in their book genera plantarum.

53. I. In Rhodophyceae, food is stored in the form of mannitol and laminarin.
II. The ovules of Gymnosperms are not enclosed by ovary wall.
III. Salvinia is heterosporous.
IV In the diplontic life-cycle, the free living gametophyte represents the dominant phase. Of the above statements.
(a) II and III are correct but I and IV are wrong.
(b) II and IV are correct but I and III are wrong.
(c) III and IV are correct but I and II are wrong.
(d) I and II are correct but III and IV are wrong.
(e) I and IV are correct but II and III are wrong.
Kerala PMT-2013

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Ans. (a) : (I) The ovules of gymnosperm are not enclosed by ovary wall.
(III) salvinia is heterosporous, where as in Rhodophyceae food is stored in the form of floridean starch. In the diplontic life-cycle, diploid sporophyte is dominant.

54. A system of classification in which a large number of traits are considered is
(a) phylogenetic system
(b) artificial system
(c) natural system
(d) synthetic system

Punjab MET-2010

Ans. (c) : The natural system of classification takes into accounts the similarities and dissimilarities between various organisms. Various features taken in to consideration are morphology, physiology, Anatomy, reproduction, cytochemistry, biochemistry etc. This was proposed by. Bentham and Hooker in "Genera plantarum".

55. Kingdom-Plantae was divided into….. divisions by Engler and Prantl
(a) 10 (b) 11
(c) 13 (d) 14

Punjab MET-2011

Ans. (c) : German botanists Adolf Engler (1843-1930) and Karl Prant (1849-1893) published their work as "Die Naturalichen Pflanzen Familien" (the natural plant families) in 23 valumes. The 303 families of flowring plants have been categorized they created 13 divisions to organize the plant kingdom.

56. The following plants are devoid of some vital organs. Arrange these in the order of absence root, stem, leaf, flower and fruit, respectively.
I. Rafflesia II. Equisetum
III. Ceratophyllum IV. Gnetum
V. Taeniophyllum
The correct order is
(a) V, I, III, II, IV (b) II, IV, I, III, V
(c) I, III, V, IV, II (d) III, I, V, II, IV

AP EAMCET-2010

Ans. (d) : Ceratophyllum these plants have no root system but some time they developes modified leaves which act as root that help to the plant body for attachment of the bottom surface.
Rafflesia :- These plants has no stem, leaves and true roots. It is an endoparasite of vein in the genus Terrastigma. It is a total root parasite.
Taeniophyllum:- It is a leafless orchid with an extremely reduce system and flattened assimilating root.
Equisetum It is the only living genus in the equisetaceae a family of vascular plant that produce by spore 12. **Gnetum:-** It is a genus of gymnosperm. They are tropical evergreen plant shrubs and lianas. Unlike other gymnosperm they possess vessel element in the xylems.

57. Which one shows the correct descending sequence with reference to the number of cohorts?
(a) Bicarpellatae, Disciflorae, Heteromerae, Calyciflorae
(b) Heteromerae, Inferae, Disciflorae, Calyciflorae,
(c) Thalamiflorae, Calyciflorae, Disciflorae, Inferae
(d) Disciflorae, Thalamiflorae, Calyciflorae, Heteromerae

AP EAMCET-2008

Ans. (c) : Thalamiflorae, Calyciflorae, Disciflorae and Inferae are show the correct descending sequence with reference to the number of cohorts.

58. The system of classification of plants proposed by these two botanists is claimed to be a natural system.
(a) Engler and Prantl
(b) Bentham and Hooker
(c) Aristotle and Theophrastus
(d) Darwin and Wallace

Karnataka CET-2012

Ans. (b) : The natural system of classification is given by Bentham and Hooker. It is based on natural observation of species.

59. Two plants can be conclusively said to belong to the same species if they :
(a) Have same number of chromosomes
(b) Can reproduce freely with each other and form seeds
(c) Have more than 90 percent similar genes
(d) Look similar and possess identical secondary metabolites.

AIPMT-2007

Ans. (b) : If two plants can reproduce freely with each other and form seeds, they are concluded to belong to the same species. Plants belonging to the same species have most of their every characteristics common and will be able to reproduce freely with each other to produce new generations.

60. According to classification of Ostwald Tippo; plant kingdom is divided into
(a) Thallophyta and vascular plants
(b) Spematophyta and Cryptogames
(c) Thallophyta and Embryophyta
(d) Phanerogames and Cryptogames

UP CPMT-2014

Ans. (c): Ostwald Tippo classification include plants into in which embryo are not formed (Thallophyta) and Embryophyta (in which embryo is formed).
Division- Thallophytic consists of algae and fungi, while embryophyta is further divided into Bryophyta, Pteridophyta, Gymnosperm and Angiosperm (division-phanerogames).

61. Bentham and Hooker had placed gymnosperms with dicotyledons and monocotyledons in their classification. Which are further divided into sub-classes and series? Under which series, family-Leguminosae is placed
(a) Coronarieae (b) Thalamifiorae
(c) Calyciflorae (d) Disciflorae

UP CPMT-2014

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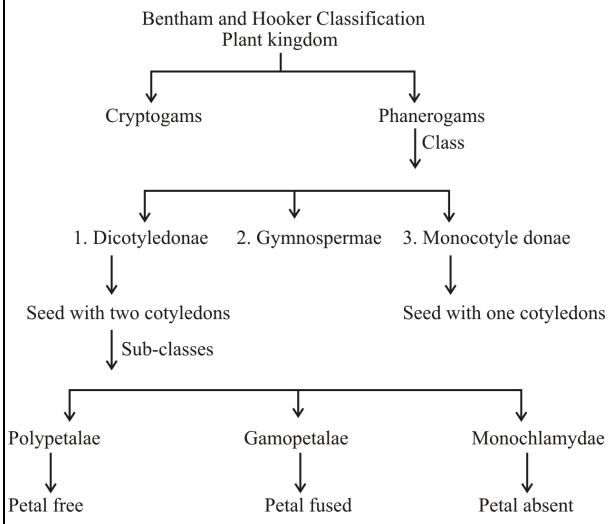
Ans. (c):



- Polypetalae has following series.

→ Thalamoflorae : - Petal and stamen (Hypogynous)
e.g. cruciferae, malvaceae

→ Disciflorae : - Petal and stamen (Hypogynous)
A Nectaferous disc at the base of ovary
e.g. Rutaceae.

→ Calyciflorae : - Petal and stamen perigynous/epigynous
e.g. Legumenaceae, cucurbetaceae.

Series calyciflorae include family legumenaceae under order - Rosales.

62. Heterothalism was discovered by

(a) Blakeslee
(b) Bessey
(c) Butler
(d) A. Flemming

UP CPMT-2006

Ans. (a) : The condition of sexual reproduction that Blakeslee observed in some species of mucorates where in conjugation is possible only through the interaction of two differing thalli is known as heterothallism. Blackeslee coined the term heterothallism in 1904.

63. Systematic botany means

(a) system analysis
(b) systematic arrangement of organs of plants
(c) systematic study of organelles and tissues
(d) methodical study of plants, dealing with identification, naming and classification

J&K CET-2009

Ans. (d) : The term systematics includes taxonomy and phylogeny i.e. identification, nomenclature, classification and evolutionary relationships.
- Taxonomy is also called systematic botany.
- The term systematic was given by C. Linnaeus.

64. Match the following lists

List -I		List – II	
(A)	Salvinia	(I)	Submerged, suspended hydrophyte
(B)	Lichens	(II)	Amphibious plant
(C)	Rhizophora	(III)	Heterosporus plant
(D)	Utricularia	(IV)	Soil formation
		(V)	Halophyte

The correct answer is

	(A)	(B)	(C)	(D)
(a)	(III)	(IV)	(V)	(I)
(b)	(III)	(II)	(V)	(I)
(c)	(V)	(III)	(IV)	(I)
(d)	(V)	(II)	(I)	(III)

AP EAMCET-2014

Ans. (a) :
Salvinia – Heterosporous plant
Lichen – Soil formation
Rhizophora – Halophyte
Utricularia – Submerged suspended hydrophyte

- Selaginella and salvinia are heterosporous pteridophytes.
- Lichens are symbiotic associations i.e. mutually useful associations, between alage and fungi. They help in soil formation.
- **Rhizophora:-** It is a facultative halophytes that grows in water of high salivity.
- **Utricularia:-** It is completely submerged and suspended in water, but not rooted.

65. A plant which lives for a few days is called

(a) annual (b) perennial
(c) biennial (d) ephemeral

JCECE-2010

Ans. (d) : Ephemeral plants are plant that grow and reproduce very quickly to take advantages of optimal conditions because of a very short growing season. These types of plant found near deserts for eg. Arabidopsis species.

66. Read the following five statements (A to E) and select the option with all correct statements:-

(A) Mosses and Lichens are the first organism to colonize a bare rock
(B) Selaginella is a homosporous pteridophyte
(C) Coralloid roots in Cycas have VAM (Main plant body in bryophytes is gametophytic, whereas in pteridophytes it is sporophytic
(D) In bryophyte the main plant is the gametophyte, whereas in pteridophyte it is the sporogenous plant.
(E) In gymnosperms, male and female gametophytes are present within sporangia located on sporophyte.

(a) (B), (C) and (D) (b) (A), (D) and (E)
(c) (B), (C) and (E) (d) (A), (C) and (D)

AIPMT-2015

Ans. (b) : Lichens and mosses are members of the pioneer species. They are the first living things to settle on an uninhabited rock. Pioneer community is the one which arises first on a bare rock or land. Bryophytes

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have diploid sets of chromosomes, while Pteridophytes have haploid set of chromosomes.
The main plant body of bryophytes is gametophytic means they have two sets of chromosomes, they are non-vascular, that is xylem and phloem are not present, in them.
Gymnosperms, male and female gametophytes are present within sporangia located on sporophytes Gymnosperms are seed bearing plant.
Selaginella belong to pteriodophytes but they are heterosporous, that is spore are differentiated into males and females.
VAM is a type of Fungal association with plants in which fungal hyphae enters the roots of the plant via penetration and thus starts absorbing the plant nutrients, but in the root of cycas, cynobacteria are present, VAM is not present in root of cycas.

67. Which one pair of examples will correctly represent the grouping Spermatophyta according to one of the schemes of classifying plants: -

(a) Acacia, Sugarcane (b) Pinus, Cycas
(c) Rhizopus, Triticum (d) Ginkgo, Pisum

AIPMT-2003

Ans. (d): Gymnosperms and angiosperms are both members of the spermatophyte, which contains plants that produce seeds.

- Ginkgo is a gymnospermic plant so it comes before and pisum (Pea) is angiospermic plant.
- Rhizopus, triticum (Fungi and Angiosperm respectively)
- Pinus, cycas (both belongs gymnosperms)
- Acacia, sugercane (both belongs Angiosperms)

68. Match items in Column I with those in Column II –

Column I		Column II	
(A)	Peritrichous flagellation	(J)	Ginkgo
(B)	Living fossil	(K)	Macrocystis/
(C)	Rhizophore	(L)	Escherichia coli
(D)	Smallest flowering plant	(M)	Selaginella
(E)	Largest Perennial algae	(N)	Wolffia

Select the correct answer with the following

(a) A –L ; B –J; C –M ; D – N ; E – K
(b) A– K ; B – J; C – L ; D –M; E – N
(c) A– J ; B – K; C – N ; D –L; E – K
(d) A– N ; B – L; C – K ; D – N; E –J

AIPMT-2005

Ans. (a) : Ginkgo belongs from gymnosperm, as a living fossil.

- E. coli express as peritrichous flagellation.
- Rhizophore is the feature of selaginella.
- Wolffia is smallest flowering plant.
- Macrocystis is the three to four species of brown algae, which is largest alga in the world.

69. The oldest fossil belongs to which of the following group of plants/animals?

(a) Asteroideae (b) Rhodophyceae
(c) Blue green algae (d) Phaeophyceae

MGIMS Wardha-2013

Ans. (c) : The oldest fossils belongs to blue-green algae. They have an extensive fossil records. The oldest known fossils, of cyanobacteria (i.e. blue-green algae) is from Achaean rocks of western Australia, dated 3.5 billion years old.

70. Diversification in plant life appeared

(a) due to long periods of evolutionary changes
(b) due to abrupt mutations
(c) suddenly on earth
(d) by seed dispersal

Manipal-2007

Ans. (a) : The plants first grew as thalloid without any roots, stems, leaves, and developed non-vascular plants, such that no vascular tissues were present. It was the initial stage of diversification. The occurrence of such evolutionary changes took a longer period of time, due to which diversifications in plants appeared. The diversification in plant life appeared due to long periods of evolutionary changes.

71. Classification based on chromosome number is:

(a) cytotaxonomy
(b) numerical taxonomy
(c) karyotaxonomy
(d) biochemistry

BCECE-2005

Ans. (a) : Classification taxonomy has taken an account of the classification of organisms by taking data from various fields like morphology, anatomy, embryology, physiology, etc. The modern approach to taxonomic classification is based on acquiring data from other subjects or complex field of biology only. Thus, we can have :

Cytotaxonomy :- Cytotaxonomy is based on cytological information like chromosome number, cellular structure, meiotic behavior.

Numerical taxonomy :- Which is carried out using computers is based on all observable characteristics.

Karyotaxonomy– It is the classification of living organism based on the structure and the number of chromosome.

Biochemistry– Biochemistry explores chemical process related to living organisms.

72. Archegonia are not found in

(a) Bryophytes (b) Pteridophytes
(c) Gymnosperms (d) Angiosperms

BCECE-2011

Ans. (d) : Archegonia are female sex organs present in bryophytes (first land plants), pteridophytes (vascular cryptogams) and gymnosperms (non flowering plants). In angiosperms, archegonia are absent.

73. Heterospory is the production of :

(a) sexual and asexual spores
(b) large and small spores
(c) haploid and diploid spores
(d) diploid and tetraploid spores

Punjab MET-2003

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Ans. (b) : Heterospory is a phenomenon in which two types of spores are formed by the same plant. The size of these spores are different. The smaller one is known as microspore and the larger one is known as megaspore. The megaspore germinates to form the female gametophyte and the microspore germinates to form the male gametophyte.
It is considered as an important step in evolution as it is a precursor to the seed habit. Heterospory was evolved first in pteridophytes such as Selaginella and Salvinia.

74. Which one of the following is considered important in the development of seed habit?
(a) Homospory
(b) Heterospory
(c) Dependent sporophyte
(d) Free living gametophyte
(e) Haplontic life-cycle

Kerala PMT-2015

Ans. (b) : Heterospory is an expression of sex determining spores of the plant.
It is the important evolutionary development in the vascular plants because it is precursor to seed development, e.g. Selaginella, Salvinia, Azolla, etc.

75. Fruits are formed in :
(a) Brassica (b) Fern
(c) Cycas (d) Funaria

MGIMS Wardha-2005

Ans. (a) : Fruit formation is the characteristic feature of angiospermic plants for eg. Brassica.

76. The non-nucleated, unicellular organisms of Whittaker's (1969) classification are included in the kingdom
(a) Protista (b) Monera
(c) Animalia (d) Plantae

CG PMT-2007

Ans. (b) : R.H. Whittaker (1969) proposed a five kingdom classification. The kingdom defined by him were named Monera, Protista, fungi, plantae and Animalia. The non-nucleated, unicellular organism are monera.
Kingdom Monera includes bacteria and they are the most abundant micro-organisms.

77. Two kingdom system of classification was given by:
(a) Linnaeus (b) John Ray
(c) Copeland (d) Whittaker

Haryana PMT-2002

Ans. (a) : Carolus Linnaeus in 1758 gave the two-kingdom classification system. He placed all the living organisms into two kingdoms. The two major kingdoms were Kingdom Plantae for plants and Kingdom Animalia for animals.
This classification laid the base for modern classification and was considered quite reasonable at the period of time, plants and animals in this system was very clearly distinguished.

78. Five-kingdom scheme to classify living beings has been proposed by
(a) JBS Haldane (b) GG Simpson
(c) E Mayr (d) R H Whittaker

CG PMT-2011, 2009

Ans. (d) : R. H. Whittaker proposed the five-kingdom classification. He divided the living organisms into five different kingdoms i.e. Monera, Protista, Fungi, Plantae and Animalia.
The important criteria of the five-kingdom classification were cell structure, body organization, mode of nutrition, reproduction, and phylogenetic relationships.

79. System of classification proposed by Linnaeus
(a) botanical system of classification
(b) sexual system of classification
(c) natural system of classification
(d) None of the above

Haryana PMT-2008
CG PMT-2006

Ans. (b) : Carolus Linnaeus proposed the artificial system of classification. Linneaus sexual system was presented by Ehret in 1736. It is mainly based on the morphological characters, non-evolutionary features.
Artificial system of classification is based on only one or a few characters. They were mainly based on vegetative characters or on the androecium structure. This is somewhat bold description.

80. Gall nuts on plants in produced by
(a) larva of dipterous insects
(b) larva of Anopheles
(c) microorganism
(d) fungi

BHU PMT (Screening)-2011

Ans. (a) : Gall nuts are pathological excrescences formed on young branches or twigs of plants, induced by insect attacks, as a result of deposition of the eggs. After sometimes the gall development stops. The insects becomes enclosed by the gall and starts feeding on gall tissues during its development. The holes on the outside of the gall indicate that the adult insects have emerged.
Gall wasps are considered to be the most important insects that induce plant galls.

81. Which of the following plant does not belong to embryophyta?
(a) Dryopteris (b) Funaria
(c) Cycas (d) Ulothrix

BHU PMT (Screening)-2011

Ans. (d) : Vascular tissue is transport of water and mineralls. It is absent in Algae (Ulothrix is a green algae). Non vascular embrophytes are the plants lacking vascular tissues, which help in transport of water and nutrients. They are also called as land plants. The embryophyta consists of bryophytes and polysporangiophytes. Living embryophytes therefore, includes hornworts, liverworts, mosses, lycophytes, ferns, gymnosperms and flowering plants.
Ulothrix does not belong to embryophyta because it is a genus of green algae. Since, algae lack embryo, they are placed in sub-kingdom Thallophyta.

82. In Bentham and Hooker's classification the way of arrangement of the three series of polypetalae reflects. This gradual evolution of flower from:
(a) dichlamydeous to monochlamydeous condition
(b) apocarpy to syncarpy
(c) hypogyny to epigyny
(d) bisexuality to unisexuality

AP EAMCET-2002

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Ans. (c) : Dicotyledons were classified by Bentham and Hooker, into three sub-groups i.e. Ploypetalae, Gamopetalae and Monochlamydeae. They further classified Polypetalae into the flowing three series:-

1. Thalamiflorae - Plants with hypogynous flowers are included.
2. Discflorae - Plants with hypogynous flowers and nectariferous discs are included.
3. Calyciflorae - Plants with perigynous and epigynous flowers are included.

Thus the way of arrangement of three series of polypetalae reflects a gradual evolution from hypogyny to epigyny. The condition in which, the calyx, corolla and stamens are situated below the ovary and free from it, on the axis is known as hypogyny. The flowers having such arrangement are called as hypogynous flowers.

Epigyny is defined as a condition where the ovary is inferior with respect to the other parts of flower, and such a flower is known as an epigynous flower.

83. Huxley is father of

(a) classical taxonomy
(b) artificial taxonomy
(c) neo-taxonomy
(d) adansonian taxonomy

Haryana PMT-2008

Ans. (c) : Huxley is regarded as the father of neo-taxonomy. The branch of science which deals with the classification of the organism is known as the neo-taxonomy.

84. Which of the following taxonomist described classification of plant in families of flowering plant?

(a) Eichler (b) Hutchinson
(c) Thakhtajan (d) Benson

BVP-2013

Ans. (b) : The book 'Families of the flowering plants' written by John Hutchinson who was an English botanist and taxonomist. In his book 'Families of the flowering plants', he classified plants into two categories i.e. monocotyledons and dicotyledons, which were classified further.

The classification was based upon many characters such as the structure of their cells, mode of nutrition, organizations of their bodies, reproduction, etc.

85. The book "Historia Plantarum" was written by:

(a) Bauhin (b) Theophrastus
(c) Malpighi (d) Bentham

AP EAMCET-2000

Ans. (b) : The book "Historia Plantarum" was written by Theophrastus who is known as father of botany. He was a Greek philosopher and the first person that tried to classify plants on the basis of their morphological features. On the basis of their heights, girth and branches, the plants were classified as trees, shrubs, sub-shrubs and herbs.

86. Tracheophyta consists of

(a) bryophytes only
(b) pteridophytes only
(c) gymnosperms and angiosperms
(d) Both (b) and (c)

Rajasthan PMT-2009

Ans. (d) : Bryophyta, gymnosperm and angiosperms are present in tracheophyta. Tracheophytes are the plants which have vascular bundles, which includes xylem and phloem. They are conducting tissues of plants. They form diploid spores.

87. The vascular cryptogames are :

(a) bryophytes (b) pteridophytes
(c) angiosperms (d) none of these

Rajasthan PMT-2000

Ans. (b) : Due to the presence of xylem and phloem in their vascular bundles Pteridophytes are known as **vascular cryptogams.** They are seedless and the production of spores is seen in their life cycle.

88. Term New Systematic was given by

(a) Julian Huxley (b) Bateson
(c) Linnaeus (d) Darwin

BCECE-2008

Ans. (a) : Julian Huxley was the botanist who introduced the term 'New systematics' in 1940. As per 'New Systematics' approach, Huxley points are explained with evolutionary, genetic and morphological traits on the basis of which the new taxonomic affinities are brought.

89. Dense evergreen vegetation of broad sclerophyllous leaves and shrubs with fire resistant resinous plants is known as

(a) chaparral vegetation (b) savannah vegetation
(c) steppe grassland (d) tundra vegetation

Haryana PMT-2011

Ans. (a) : Dense evergreen vegetation of broad sclerophyllous leaves and shrubs with fire resistant resinous plants is known as chaparral vegetation. It is a shrubland or heathland plant community found primarily in Mexico. Chaparral vegetation occurs in mediterranean area, pacific coast of North America, Chile, South Africa and South Australia. The climate here is hot with dry summers and wet winters, with annual rainfall of 60-80 cm.

90. The genera that lacks cotyledons but is placed with dictoyledonous plants, in classification is

(a) Datura (b) Capsicum
(c) Triticum (d) Cascuta

AMU-2001

Ans. (d) : The cuscuta is a parasitic flowering plant that is found in the tropical and temperate regions. This plant lacks cotyledons and it is a parasitic plant.

B. Algae

91. Agar-agar is obtained from:

(a) green algae (b) blue-green algae
(c) red algae (d) brown algae

VMMC-2012, 2011, 2010
UP CPMT-2012, 2008
BVP-2012 / JIPMER-2009
MGIMS Wardha-2008
CMC Ludhiana-2008
AFMC-2003 / BCECE-2002
BVP-2001
Rajasthan PMT-2006, 2000
AMU-2006, 1996, 1995

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Ans. (c) : Agar-agar is obtained from red algae for ex. Gelidium, Gracilaria and Eucheuma.

92. Which of the following is a phaeophycean algae?

(a) Gelidium (b) Polysiphonia
(c) Porphyra (d) Laminaria
(e) Gracilaria

Kerala PMT-2012
UP CPMT - 2010
Punjab MET - 2009
AFMC-2000
BVP-2000

Ans. (d) : The pheophycean algae or brown algae is a large group of mostly marine multicellular algae, including many sea weeds of colder northern hemisphere waters. They play an important role in marine environments both as food and for the habitats.

93. Zygote of Spirogyra produces four haploid nuclei, in which :

(a) one is functional (b) two are functional
(c) three are functional (d) all are functional

Uttarakhand PMT-2004
Manipal-2004
UP CPMT-2001
AMU-2005

Ans. (a) : The zygospore is the union of the protoplasmic mass of two gametes which is called zygote (zygospore). Zygospores are the only diploid stage in the life cycle of spirogyra. The diploid zygospore nucleus undergoes meiosis and forms 4 nuclei three of these aborts and only one is functional prior to germination. It undergoes transverse division to give, rise single filament.

94. Iodine is obtained from

(a) Laminaria (b) Chlorella
(c) Polysiphonia (d) Porphyra

CMC Vellor -2013
Haryana PMT - 2011
MGIMS Wardha-2008
JIPMER-2008
BHU PMT (Screening)-2007

Ans. (a) : Laminaria contains iodine, a component that the body needs to make thyroid hormone.
It is a type of seaweed known as laminaria is indigenous to Japan. additionally, it is a good source of potassium and iron.

95. Which of the following is an algal parasite?

(a) Volvox (b) Ulothrix
(c) Porphyra (d) Cephaleuros

BCECE-2014
Uttarakhand PMT-2008
BHU-PMT (Screening)-2008
Rajasthan PMT-2006
BHU PMT-2004

Ans. (d) : Cephaleuros is a parasitic because being green algae it grows on other plants for providing support, but as long as it resides on another plant, during favorable conditions it behaves as parasitic. It is a genus of parasitic thalloid green algae comprising approximately 14 species. It infects plants and causes red rust disease.

96. Which of the following is known as pond silk ?

(a) Spirogyra (b) Ulothrix
(c) Nostoc (d) Anabaena

HP CET-2011
CG PMT-2010
BCECE-2006
VMMC-2005
AMU-2004

Ans. (a) : Spirogyra possesses a spiral arrangement of chloroplast, which are chlorophyll, containing green pigments. Pond silk is another name for it. It has two-layered cell walls, the inner layer is made up of cellulose whereas the outer layer is made up of pectin.

97. Which one is a parasitic alga?

(a) Oedogonium (b) Cephaleuros
(c) Spirogyra (d) Cladophora

JIPMER-2018
Rajasthan PMT - 2005
Uttarkhand-2005
BVP - 2002
BHU PMT-2001

Ans. (b) : *Cephaleuros* is a genus of parasitic algae which causes red rust of tea and coffee.
- *Cephaleuros virescens* → causes red rust of tea.
- *Cephaleuros arabica* → caused red rust of coffee.

98. Floridean starch is the stored food in

(a) Gracilaria
(b) Spirogyra
(c) Sargassum
(d) Charia

TS EAMCET-10.05.2023, Shift-II

Ans. (a) : Floridean starch is food in graularia
- Floredian starch is the chorectristic photosynthesis reserbe sabtance of Red Algai ocuring Aboundantly in certain Basin shaped grain cells.
- Most Rhodophyceae store starch outside the chloroplast often As A cap over a bulging pyrenoid.
- The major corbohydrate storage product of Red Algai is a type of starch molecule (Florediah starch) that is more highly branched than Amylopactin

99. Match the following

List-I		List-II	
A.	Monoecious plant	1.	Cycas
B.	Vivipary	2.	Liverworts
C.	Gemma	3.	Rhizophora
D.	Heterogametes	4.	Chara

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(a) A – II, B – III, C – I, D – IV
(b) A – III, B – IV, C – I, D – II
(c) A – IV, B – III, C – I, D – II
(d) A – IV, B – III, C – II, D – I

TS EAMCET 10.05.2023 Shift-I

Ans. (d) :

List-I		List-II	
A.	Monoecious plant	IV.	Chara
B.	Vivipary	III.	Rhizophora
C.	Gemma	II.	Liverworts
D.	Heterogametes	I.	Cycas

100. Assertion (A) : Most of the algal genera have haplontic life cycle
Reason (R) : Fucus show diplontic life cycle
The correct option among the following is
(a) (A) and (R) are true. (R) is the correct explanation for (A)
(b) (A) and (R) are true, (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : Most of the alga shows haplontic life cycle but some are shows different types of life cycle. e.g.
Diplontic- Fucus, Sargassum, diatoms etc.
Diplobiontic- Ulva, ectocarpus.
Triplobiontic- Batrachospermum.

101. Match the following

List-I		List-II	
A.	Nostoc	1.	Plasmodium
B.	Mycoplasma	2.	Auxospores
C.	Diatoms	3.	Witches broom
D.	Sporozoan	4.	Heterocyst

(a) A – III, B – IV, C – I, D – II
(b) A – II, B – III, C – IV, D – I
(c) A – IV, B – III, C – II, D – I
(d) A – IV, B – III, C – I, D – II

TS EAMCET 10.05.2023 Shift-I

Ans. (c) :

List-I		List-II	
A.	Nostoc	IV.	Heterocyst
B.	Mycoplasma	III.	Witches broom
C.	Diatoms	II.	Auxospores
D.	Sporozoan	I.	Plasmodium

102. Female sex organ in Polysiphonia of Rhodophyceae
(a) Spermatia
(b) Carpogonium
(c) Cystocarp
(d) Archegonium

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : • Most of the Red algae are marine. Red colour due to the presence of phycoerythrin which reflects red light and absorb the blue light.
• reproduction is specialized with male gamete- spermatium being non motile. It is carried passively by the water currents and is lodged in the trichogyne of the female sex organ- **Carpogonium,** It is a flask- shaped structure, the basal part is swollen having a single egg.

103. Identify the correct pair from the following

A	**Golden algae**	**-diatoms**
B	**Trichodesmium erythrium**	**-Red Sea**
C	**Kieselguhr**	**- Chrysophytes**
D	**Red tides of Mediterranian sea**	**- Dinoflagellates**

(a) B C D (b) A B C
(c) A C D (d) A B D

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Correct pair is-

B	Trichodesmium erythrium	-Red Sea
C	Kieselguhr	-Chrysophytes
D	Red tides of Mediterranian sea	- Dinoflagellates

104. The following is extracted from Laminaria
(a) Algin (b) Agar
(c) Iodine (d) Carrageen

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : Iodine extracted from brown algae Laminaria which is belongs to class pheophyceae (brown algae).

105. Which classes of algae possess pigment fucoxanthin and pigment phycoerythrin, respectively?
(a) Chlorophyceae and Rhodophyceae
(b) Rhodophyceae and Phaeophyceae
(c) Phaeophyceae and Chlorophyceae
(d) Phaeophyceae and Rhodophyceae

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : Fucoxanthin is a xanthophylls carotenoid abundant in macro algae, such as brown sea weeds (pheophyceae).
• Phycoerythrin is a major light- harvesting pigment of red algae and cyanobacteria.
• The pheophyceae photosynthetic pigments include chlorophyll A, C and β carotene and xanthophylls like fucoxanthin.
• Fucoxanthin partially mask the chlorophyll and carotenoid there by giving the characteristic brown coloration.
• Rhodophyceae (Red algae) photosynthetic pigments chlorophyll A and D and biliproteins such as r-phycoerythrin and r-phycocyanin.

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106. Reserve food in the form of floridean starch and the soluble sugar-floridoside is found in

(a) Phaeophyta (b) Chlorophyta
(c) Cyanophyta (d) Rhodophyta.

Karnataka CET - 2023
AMU-1998

Ans. (d) : In Rhodophyta, reserve food material is floridean starch. Floridean starch (which stains red with iodine solution) and also soluble sugars called floridoside and glycerol compounds. Rhodophyta are the only ones not to produce motile forms. Example of red algae are Porphyra and Gelidium.

107. Match the following. The correct combinations are

List-I	List-II	List-III
A) Cryptomonas	**i) Pantonematic**	**p) 1 row of lateral appendages**
B) Polytoma	**ii) Stichonematic**	**q) No lateral appendages and terminal filament**
C) Euglena	**iii) Acronematic**	**r) 2 rows of lateral appendages**
D) Monas	**iv) Anematic**	**s) Terminal filament**

(a) $(A-iv-r),(B-iii-p),(C-ii-q),(D-i-s)$
(b) $(A-iv-s),(B-iii-q),(C-ii-r),(D-i-p)$
(c) $(A-iv-q),(B-iii-s),(C-ii-p),(D-i-r)$
(d) $(A-iv-p),(B-iii-r),(C-ii-s),(D-i-q)$

AP EAPCET-11.07.2022 Shift-I

Ans. (c) :

	List-I	List-II	List-III
A	Cryptomonas	Anematic	No lateral appendages and terminal filaments
B	Polytoma	Acronematic	Terminal filaments
C	Euglema	Stichonematic	I row of lateral appendages
D	Monas	Pantonematic	2 rows of lateral appendages

i. Pantonematic- Two or more rows of lateral appendages present on both side of the flagellum.
Example- Monas
ii. Stichonematic- The lateral appendages are present on one side of the flagellum.
Example- Euglena
iii. Acronematic- The lateral appendages are absent and the distal ends of the flagellum end as a terminal nacked, axial filament.
Example- Polytoma
(iv) Anematic- The flagellum is simple without lateral appendages and or terminal nacked filament are absent.
Example- Cryptomonas

108. Agarose is a natural polymer extracted from

(a) Fungi (b) Bryophytes
(c) Sea Weeds (d) Pteridophytes

AP EAPCET-11.07.2022 Shift-I

Ans. (c) : D-galactose and 3, 6 anhydro-L-galactose are the two sugar that make up the natural polymer agarose, which is made from red algae, or seaweed.
Agarose is a main component as agar, which is a polysacharide extracted from seaweed.
• Agarose is most commonly used as the medium for analytical scale electrophoretic seperation in agarose gell electrophoresis gell made from purified agarose have a relativily large pore size, making them useful for seperation of large molecule such as proteins and protein complexes as well as DNA fragments.

109. Air bladders are found in the following plant

(a) Fucus (b) Laminaria
(c) Dictyota (d) Polysiphonia

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Fucus is marine brown algae which belong class phaeophyceae. Plant body of fucus differentiated into basal discoid holdfast which anchors it to the substratum, a short stipe and a flattened, dichotomously branched frond.
• Air bladders occurs in the upper portion of the frond that give bouncy to the plant.

110. Read the following statements and identify the characters related to the alga shown in the diagram:

(A) It is a member of Chlorophyceae
(B) Food is stored in the form of starch
(C) It is a monoecious plant showing oogonium and antheridium
(D) Food is stored in the form of laminarin or mannitol
(E) It shows dominance of pigments Chlorophyll a, c and Fucoxanthin
Choose the correct answer from the options given below:

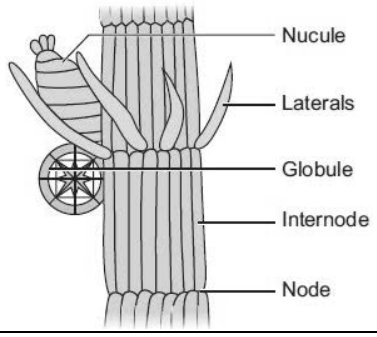
(a) (A) and (B) only
(b) (A), (B) and (C) only
(c) (A), (C) and (D) only
(d) (C), (D) and (E) only

NEET (Re-Exam)-04.09.2022

Ans. (b) : Chara is belong to class chlorophyceae. They are multicellular and superficially bear a resemblance to land plants because of stem-like and leaf-like structures. They are stored food in the form of starch and oil.

@apna_pdf

- Chara is commonly known as "Stonewort" The plant body of chara is encrusted with calcium and magnesium carbonated especially on the plants growing in heavy water.
- Sexual reproduction of chara is an advanced **oogamus type**.
- The sex organs are macroscopic and large.
- The male sex organ is spherical and yellow to red in colour called **globule** or antheridium.
- The female sex organ is more or less oval and green in colour called the **nucule** of oogonium.



111. Hydrocolloid carrageen is obtained from:
(a) Phaeophyceae only
(b) Chlorophyceae and Phaeophyceae
(c) Phaeophyceae and Rhodophyceae
(d) Rhodophyceae only

NEET-2022, 2021

Ans. (d) : Hydrocolloid are water holding substance for eg. **Carrageen,** which is obtained from red algae. Carrageen is extract from red seaweed commonly known as Irish moss (Chondrus Crispus). It is used as a thickener and emulsifier and commonly found in processed dairy products.

112. Which of the following is incorrectly matched?
(a) Volvox – Starch
(b) Ectocarpus – Fucoxanthin
(c) Ulothrix – Mannitol
(d) Porphyra – Floridian Starch

NEET-2022

Ans. (c) : Volvox is a member of chlorophyceae which is known as green algae. It contains starch.
Ectocarpu is a member of phoeophyceae, they contain fucoxanthin and found in marine habitats.
Ulothrix is a member of cholorophyceae and contains starch.
Mannitol is brown-algae and basically store food material.
Porphyra comes in the family of Rhodophyceae and contain floridian starch. Hence option (c) is incorrectly matched.

113. Match List - I with List - II:

List-I		List-II	
A.	**Chlamydomonas**	**i.**	**Moss**
B.	**Cycas**	**ii.**	**Pteridophyte**
C.	**Selaginella**	**iii.**	**Algae**
D.	**Sphagnum**	**iv.**	**Gymnosperm**

Choose the correct answer from the options given below:
(a) (A) - (iii), (B) - (i), (C) - (ii), (D) - (iv)
(b) (A) - (iii), (B) - (iv), (C) - (ii), (D) - (i)
(c) (A) - (iii), (B) - (ii), (C) - (i), (D) - (iv)
(d) (A) - (ii), (B) - (iii), (C) - (i), (D) - (iv)

NEET (Re-Exam)-04.09.2022

Ans. (b) : 1. Chlamydomonas is a green algae.
2. Cycas is a gymnosperm, it is tallest gymnosperm.
3. Selaginella is a pteridophyte, it is belong to class Lycopsida.
4. Sphagnum also known as peat moss.

114. Arrange the functions of the following respectively.
(A) Elaters (B)Indusium (C) Agar

A.	To grow microbes	Spore dispersal	covering of sorus
B.	Covering of sorus	Spore dispersal	To grow microbes
C.	Spore dispersal	To grow microbes	Covering of sorus
D.	Spore dispersal	Covering of sorus	To grow microbes

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : Elaters aid in the spread of spores in some liverworts. The liverwort capsule has a cell component called elaters that attracts water. Its nature is hygroscopic.It helps in dispersal of Spores.
Indusium- A flap of tissue that protects the sori in some ferns. This can take a variety of forms. When spores are mature and ready for release, the indusial usually Shrivel or bend backwards to expose the **sporangia.**
Agar-agar- Agar-agar, is a jelly-like substance consisting of Polysaccharides obtained from the cell walls of some species of red algae, Primarily from ogonori (Gracilaria) and Tengusa (Gelidiaceae).

115. Study the following table and pick up the correct combinations :

S.No.	Type of flagellum	Lateral appendages	Example
I	Pantonematic	One row	Euglena
II	Stichonematic	One row	Astasia
III	Acronematic	Absent	Polytoma
IV	Pantacronematic	Two or more rows	Urceolus

(a) I, II (b) II, III
(c) III, IV (d) I, IV

TS EAMCET-10.08.2021 Shift-I

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Ans. (c): Pantacronematic flagella- In these mastigonemes arranged in two opposite rows or radically. **Ex. - Pyronema**.
Stichonematic - The mastigonemes develop only on one side of the flagellum **Ex. - Euglena and Astasia.**
Acronematic -They have no mastigonemes **Ex. - Polytoma & chlamydomonas.**
Pantacronematic - With a terminal fibril. **Ex. - Mercilus, Urceolus.**

116. Assertion (A) : When a green alga Cladophora is placed in a suspension of aerobic bacteria, on illumination of different lights, only at blue and red light bacteria accumulated.
Reason (R) : The bacteria release O_2 by the process of photosynthesis.
The correct option among the following is :
(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

Ans. (c) : Engelmann (1843-1909) discovered the effect of different wavelength of light on photosynthesis and plotted the first action spectrum of photosynthesis. He split light into components by the prism and then illuminated green alga Cladophora that was placed in suspension of aeorbic bacteria. Conclusion of the Engelmann experiment is that, "evolution of oxygen" which is proved at blue and red light maximum showing oxygen.

117. In Oogamy, fertilization involves _____
(a) A small non motile female gamete and a large motile male gamete
(b) A large non motile female gamete and a small motile male gamete
(c) A large non motile female gamete and a small non-motile male gamete
(d) A large motile female gamete and a small non-motile male gamete

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Fusion between one large, non-motile (static) female gamete and a smaller, motile male gamete is termed as oogamous or oogamy. e.g. Volvox, Fucus. Whereas Anisogamous is fusion of two gametes dissimilar in size. Isogamous is fusion between two flagellated/unflagellated and similar in size gametes.

118. Green algae store food in the form of _A_ in specialized structures called _B_ located in _C_ . Fill in the blank with respect to A, B, C and choose the correct option?
(a) A-starch, B-pyrenoids, C-chloroplasts
(b) A-fat, B-ribosomes, C-pyrenoids
(c) A-protein, B-chlorophyll, C-pyrenoids
(d) A-carbohydrate, B-plastids, C-pyrenoids

AP EAMCET-03.09.2021 Shift-II

Ans. (a) : In Green algae stored food material is starch. Most of the members have one or more storage bodies called pyrenoids located in the chloroplast. Pyrenoids contain protein besides starch.

119. Which of the following algae contains mannitol as reserve food material?
(a) Ulothrix (b) Ectocarpus
(c) Gracilaria (d) Volvox

NEET-2021

Ans. (b) : Mannitol is a type of stored food present in phaeophyceae also known as **brown algae**.
Example - Ectocarpus, Fucus, Kelps, Sargassum etc.
• **Ulothrix** and Volvox belong to Chlorophyceae **(green algae)** members of this class have starch as reserve food material.
• **Gracilaria** is a genus of **red algae** (Rodophyta) reserved food material found in floridean starch.

120. The plant body having holdfast, stipe and frond is a characteristic of
(a) Laminaria (b) Volvox
(c) Gelidium (d) Porphyra

Karnataka CET-2021

Ans. (a) : Class-phaeophyceae, has a stalk called stip and a leaf-like photosynthetic organ called frond, and is typically held to the substrate by a hold fast. In Laminaria frond can be described as a leaf-like photosynthetic organ. The hold fast is used for attaching to the substratum while the stipe acts as a stalk.

121. Female reproductive structure of chara is
(a) Gynoecium (b) Carpel
(c) Nucule (d) Archegonium

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : Chara has the capability to reproduce both sexualy and in a vegetative mode. The male sex organ is called the globule, whereas the female sex organ is called nucule or oogonium. It is more or less oval-shaped and green in colour. It is often found separately above the antheridium or globule.

122. Floridean starch has structure similar to
(a) Amylopectin and glycogen
(b) Mannitol and algin
(c) Laminarin and cellulose
(d) Starch and cellulose

NEET-2020 Phase-I
BHU PMT (Mains)-2011

Ans. (a) : Red algae (rhodophyceae) store their food in floridean starch. This substance shares a structure with glycogen and amylopectin. Amylopectin is a highly branched polymer of glucose found in plants where as glycogen is a highly branched polymer of glucose found in animals and some bacteria.

123. Phycoerythrin is the major pigment in
(a) Brown algae (b) Red algae
(c) Blue green algae (d) Green algae

NEET-2020 Phase-II

@apna_pdf

Ans. (b) : In Red algae major pigments are chlorophyll a, d and phycoerythrin. Blue-green algae (Cyanobacteria) contain chlorophyll-a along with yellowish carotenoids, the blue pigment phycocyanin. Green algae consist of chlorophyll-a, chlorophyll-b, β Carotene, Xanthophylls. Brown algae contains chlorophyll a, c and fucoxanthin.

124. Isogametes are found in:

(a) Focus (b) Homo-sapiens
(c) Cladophora (d) None of the above

GUJCET-2020

Ans. (c) : Isogametes are found in cladophora. It is a genus of reticulated filamentous ulvophyceae. It contains species that are very hard. They are green algae.

125. Assertion (A): In Algae, haplontic life cycle is the dominant phase.
Reason (R): In many algae zygote divides by meiosis immediately after karyogamy to form haploid spores.
The correct answer is:

(a) Both (A) and (R) are true. (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true.

TS EAMCET-09.05.2019 Shift-I

Ans. (a) : Gametes fuse in fertilization to produce a diploid zygote, but that zygote immediately undergoes meiosis to produce haploid spores.
Ex:- Green algae like Volvox, Spirogyra, Chlamydomonas etc.

126. The pigment chlorophyll 'C' is present in

i. Dictyota **ii. Ulothrix**
iii. Porphyra **iv. Sargassum**
The correct combination is

(a) i, ii (b) i, iv
(c) ii, iii (d) iii, iv

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : The pigment cholophyll 'c' is present in members of pheophyceae (brown algae) e.g Dictyota & Sargassum.
Ulothrix is a green algae and non-branching filamentous. Porphyra is a red algae.

127. Choose the correct statement.

(a) Red colour of the red sea is due to dinoflagellates.
(b) Heterocysts of cyanobacteria fix atmospheric nitrogen.
(c) Mycoplasmas are pleomorphic due to the presence of cell wall.
(d) Presence of mycolic acid in the cell wall of diatoms is the reason for the left over cell deposits in large amounts in their habitats.

AP EAMCET-24.04.2019 Shift-II

Ans. (b) : Cynobacteria include anabaena. It is able to fix nitrogen from the atmosphere. Nitrogen is changed into ammonia by it. The heterocysts present in it are specialized cyanobacterial cells for nitrogen fixation. It contains enzymes Nitrogenase. Nitrogenase is inactivated by oxygen. Hence, the heterocyst creates a micro anaerobic environment.

128. Match the column-I and column-II

	Column-I		Column-II
(i)	**Chrysophyta**	**(A)**	**Fungi**
(ii)	**Gonyaulax**	**(B)**	**Diatom**
(iii)	**Penicillium**	**(C)**	**Plasmodium**
(iv)	**Slime mould**	**(D)**	**Dinoflagellate**

(a) (i) – A, (ii) – B, (iii) – C, (iv) – D
(b) (i) – B, (ii) – C, (iii) – A, (iv) – D
(c) (i) – B, (ii) – C, (iii) – D, (iv) – A
(d) (i) – B, (ii) – D, (iii) – A, (iv) – C

AIIMS-26.05.2019 Shift-II

Ans. (d) :

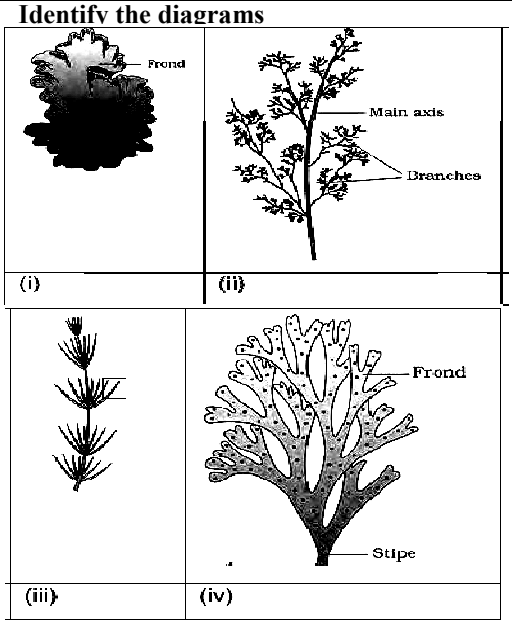
(i)	Chrysophyta	(B)	Diatom
(ii)	Gonyaulax	(D)	Dinoflagellate
(iii)	Penicillium	(A)	Fungi
(iv)	Slime mould	(C)	Plasmodium

- **Chrysophyta** are a group of algae commonly found in lakes. Brown algae as well as diatoms were formerly referred to as chrysophyte.
- **Gonyaulax-** *Gonyaulax* belongs to red dinoflagellates and commonly cuased red tides.
- **Penicillium-** *Penicillium* is a fungus it is included in the family *Aspergillaceae* of the class ascomycetes.

Example :
Penicillin A- *Penicillium chrysogenum*
Penicillin B- *Penicillium notatum.*

- **Plasmodium-** Slime moulds are a large single celled mass with thousands of nuclei called a plasmodium.

129. Identify the diagrams



(a) (i) – Porphyra, (ii) – Polysiphonia, (iii) – Chara, (iv) – Dictyota
(b) (i) – Polysiphonia, (ii) – Porphyra, (iii) – Chara, (iv) – Ectocarpus
(c) (i) – Laminaria, (ii) – Polysiphonia, (iii) – Chlamidomonas, (iv) – Fucus
(d) (i) – Dictyota, (ii) – Polysiphonia, (iii) – Chara, (iv) – Porphyra

AIIMS-26.05.2019 Shift-II

Ans. (a) : Porphyra- The phylum rhodophyta includes the red algal species porphyra. It is frequently discovered in shallow water and has significant economic impact as an edible seaweed.

@apna_pdf

- **Polysiphonia-** Polysiphonia belongs class Rhodophyceae. Most of the species are lithophytic (Growing on rock). Some are epiphytic growing on other algae. Polysiphonia large multiaxial annual or perennial thalli. Polysiphonia form thick tuft or dens bushes are brown or violet-red colour. They are attach by rhizoid to a rocky surface or other algae.
- **Chara-** In chara, both male and female sex organ present on same plant. i.e. monocious.
- **Dictyota-** A genus of brown seaweed in the Dictyotaceae family is called Dictyota.
  The majority of these species are found in tropical and subtropical oceans, and it is knwon that they contain a variety of compounds (diterpenes) that may be useful medically.

130. Which one is wrongly matched?

(a) Uniflagellate gametes – Polysiphonia
(b) Biflagellate zoospores – Brown algae
(c) Unicellular organism – Chlorella
(d) Gemma cups – Marchantia

NEET-2018

Ans. (a) : Polysiphonia is red algae in which reproduction is oogamous type i.e. where a asexual spores and gametes are non-motile or non-flagellated.
- Biflagellate zoospores – Brown algae
- Unicellular organism – Chlorella
- Gemma cups – Marchantia

131. The characteristic feature of Ectocarpus is

(I) Green, filamentous algae with simple branches
(II) Cells contain chlorophyl a, d, carotenoids and xanthophylls
(III) Life cycle is haplodiplontic
(IV) Zoospores are pyriform with two flagella attached laterally

Options:

(a) I, II (b) I, III
(c) III, IV (d) II, IV

AP EAMCET-25.04.2018 Shift-II

Ans. (c): Ectocarpus is a filamentous brown algae. Their life cycle is haplodiplontic and asexually reproduce by asexual zoospore formation which is pyriform and biflagelated flagella attaches laterally.

132. Study the following lists :

List-I	**List-II**
(A) Fucoxanthin	**(i) Liverworts**
(B) Chlorophyll D	**(ii) Strobili**
(C) Ginkgo	**(iii) Rhodophyceae**
(D) Amphibians	**(iv) Phaeophyceae**
	(v) Living fossil

The correct answer is

	A	**B**	**C**	**D**
(a)	(iii)	(iv)	(ii)	(v)
(b)	(iv)	(iii)	(v)	(i)
(c)	(ii)	(iv)	(iii)	(v)
(d)	(iv)	(iii)	(v)	(ii)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) :

	List – I	List - II
a.	Fucoxanthin	Phaeophyceae
b.	Chlorophyll. D	Rhodophyceae
c.	Ginkgo	Living fossil
d.	Amphibians	Liver worts

133. Which of the following shows heterotrichous habit?

(a) Ectocarpus (b) Euglena
(c) Ulothrix (d) Spirogyra

JIPMER-2018
AP EAMCET - 25-04-2018 Shift - II, 1996
JIPMER-1996

Ans. (a) : Heterotrichus condition (habit) shows in ectocarpus. It is consisting of prostrate and erect system. The filaments of the erect systemize from the filaments of prostrate system. Prostrate system consists of creeping irregularly branched filaments.

134. Which of the following bear a flagellum without lateral appendages and the terminal part of the axonema is naked without the outer sheath at its tip

A) Peranema
B) Monas
C) Polytoma
D) Chlamydomonas

(a) A, C (b) B, D
(c) A, B (d) C, D

TS EAMCET-03.05.2018 Shift-I

Ans. (d) : Acronematic - This type of flagellum does not bear lateral appendages and the terminal part of the axoneme is naked without the outer sheath at its tip.
Example – Chlamydomonas and polytoma there is no mastigonemes present in flagella, they are called acronematic flagella. This type of flagella found in chlamydomonas.

135. The major pigments present in the members of Rhodophyceae are

(a) Chlorophyll a, c and Carotenoids
(b) Chlorophyll a and b
(c) Chlorophyll a, d and phycoerythrin
(d) Chlorophyll a and Phycocyanin

TS EAMCET-03.05.2018 Shift-I
AFMC - 2007
AIPMT-2000

Ans. (c) : In Rhodophyceae major pigments are chlorophyll a, d and phycoerythrin. The members of rhodophyceae are commonly called red algae.

136. Members of Phaeophyceae possess

i) Gelatinous coating of algin
ii) Unequal and lateral flagellae
iii) Pyrenoids
iv) Phycobilisomes

(a) i & iii (b) i & ii
(c) iii & iv (d) ii & iv

TS EAMCET-03.05.2018 Shift-I

Ans. (b) : Phaeophyceae (brown algae) is a large group of mostly marine algae. Cell wall has cellulose and lignin or gelatinous coating of algin. Found in brown sea weeds.
Phaeophyceae contain fucoxanthin pigment responsible for their brownish green colour. They reproduce by flagellated spores. Their spores are pear shape and have 2 unequal flagella oriented in a lateral manner.

137. Shape of chloroplast of Ulothrix is

(a) star-shaped (b) band-shaped
(c) girdle-shaped (d) spinal-shaped

JIPMER-2018

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Ans. (c) : Ulothrix has a girdle-shaped Chloroplast that houses one or more Pyrenoids.
Ulothrix has a filamentous, long, unbranched, multicellular thallus. It is a freshwater alga that grows on sand, rock and other types of soil.
Where as, a common sight floating a top stagnant water, algae of the genus zygnema can be identified microscopically by its two star shaped chloroplasts per cell.

138. Eyespot is seen in
(a) Chlamydomonas (b) Ulothrix
(c) Spirogyra (d) Polysiphonia
JIPMER-2018

Ans. (a) : The eye spot has a colourless biconvex photosensitive lense and curved pigmented plate found in chlamydomonas which lies the near anterior end of body.
• It is a photoreceptive organ and function as a primitive eye.

139. Palmella stage is present in
(a) Aspergillus (b) Cystopus
(c) Chlamydomonas (d) None of these
JIPMER-2018
BHU PMT - 2002

Ans. (c) : Algae, especially chlamydomonas and euglena, can reproduce asexually through the palmella stage. The palmella stage is formed under unfavourable conditions as shortage of water, excess of salts, etc. The protoplast of parent cell divides to make many daughter protoplasts but they do not form zoospores. The parent cell wall gelatinize to make mucilaginous sheath around daughter protoplasts.

140. Motile zoospores are produced by
(a) Chlamydomonas (b) Penicillium
(c) Bacteria (d) Amoeba
MHT CET-2017

Ans. (a) : Chlamydomonas reproduce by structure called zoospores. That usually microscopic motile structures. zoospores are flagellated asexual spores produced in chlorophyceae.

141. Which class of Algae reproduces asexually by non-motile spores and sexually by non-motile gametes?
(a) Rhodophyceae (b) Phaeophyceae
(c) Chlorophyceae (d) Cyanophyceae
Karnataka CET-2017

Ans. (a) : In member of rhodophyceae are presence of red pigment r-phycoerythrin in their body is known as red algae.
Rhodophyceae-group algae are capable of both sexual and asexual reproduction. The non-motile spores that eventually become the new cell body are created during asexual reproduction. The marging of the non-motile gamets to create the embryo, which then grows to form the new algal body, is the process of sexual reproduction.

142. Mac-Conkey medium is an example of
(a) Transport medium
(b) Enrichment medium
(c) Differential medium
(d) Simple medium
SRM JEEE -2017

Ans. (c) : A bacterial culture medium called macConkey agar (MAC) is named after the bacteriologist alfred T. macConkey (1861-1931). MacConkey agar is an example of medium that is both deferential and selective. The presence of bile salts, as well as crystal violet within the media prevent gram–positive organisms from growing.

143. A nitrogen fixing blue green alga is
(a) Ulothrix (b) Spirogyra
(c) Anabaena (d) Rhizobium
SRM JEEE -2017

Ans. (c) : Anabaena are known for their nitrogen fixing abilities, which is a blue- green algae. It is a unicellular prokaryotic organism.
• It fix atmospheric nitrogen into ammonia and make it available to the plants.

144. The simple type of plant body in which a single cell performs all the vital functions of life is referred to as_____
(a) Unicellular (b) Monocellular
(c) Acellular (d) Noncellular
SRM JEEE -2017

Ans. (a) : Unicellular algae are plant like autotrophs and contain chlorophyll.
They include groups that have both multicellular and unicellular species.
Euglenophyta flagellated mostly unicellular algae that occur often in fresh water.

145. Zygotic meiosis is characteristic of
(a) Marchantia (b) Fucus
(c) Funaria (d) Chlamydomonas
NEET-2017

Ans. (d) : Zygotic meiosis is the characterstic feature of lower algae like Clamydomonas which is haploid plant.
• In zygotic meiosis, meiotic division happens in zygote resulting in the development of hoploid individuals. Thallophytes have dominant gametophytic generation i.e. the proximity of hoploid individuals.

146. An example of colonial alga is
(a) Chlorella (b) Volvox
(c) Ulothrix (d) Spirogyra
NEET-2017
Manipal-2010

Ans. (b) : Volvox is a genus of a green algae. It is a colonial algae consisting of thousands of cells.
- **Colonial algae** is a kind of algae consisting of cells resembling free swimming unicells making groups.
- **Chlorella** is a unicellular algae and spirogyra and **Ulothrix** are filamentous and multicellular algae.

147. How many filaments of Spirogyra are produced by germination of 100 zygospores?
(a) 100 (b) 200
(c) 400 (d) 50
Uttarakhand PMT-2011

Ans. (a) : Spirogyra are produced by germination of 100 zygospores in 100 filaments.

148. Which of the following algae exhibits gametic meiosis?
(a) Chara (b) Sargassam
(c) Polysiphonia (d) Oedogonium
Uttarakhand PMT-2011

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Ans. (b) : Sargassum algae exhibits gametic meiosis. It is a genus of brown macroalgae in the order fucales of the phaeophycae class.

149. Cyanophycean algae are much important from point of view of
(a) food and fodder value
(b) medicinal value
(c) fibres and oils
(d) soils fertility

Uttarakhand PMT-2011

Ans. (d) : Cyanophycean algae are much important from point of view of soil fertility and water retention and improve soil structure and stability.

150. Cell wall of Chlamydomonas contains:
(a) cellulose (b) glycoproteins
(c) protein (d) hemicelluloses

J&K CET-2002

Ans. (b) : Cell wall of Chlamydomonas contains glycoproteins. Glycoproteins which also appear in the extracellular matrix of multicellular green algae and higher plants makeup the cell wall of the unicellular green algae chlamydomonas.

151. The thallus of Volvox is called
(a) coenocytes (b) filament
(c) heterotrichous (d) coenobium

JCECE-2005
Manipal-2000
AIIMS-1994

Ans. (d) : A colonial green alga is called volvox. The plant body is called coenobium because the cells are undeniably organized. Among motile forms the coenobium of volvox are the baggers most distinctive and highly developed.

152. Iodine is obtained from the members of
(a) green algae (b) brown algae
(c) red algae (d) blue-green algae

CMC Vellore-2013

Ans. (b) : Iodine is obtained from the member of brown algae
Examples- Ectocarpus, Laminaria, Fucus Sargassum etc.

153. The microalgae of commercial interest would include (1) Spirulina (2) Spirogyra (3) Botryococcus (4) Dunaliella
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2010

Ans. (a) : The microalgae of commercial interest would include-
(i) Spirulina that is used as a biofertilizer in agriculture sector for their potential role in food safety and sustainable crop production.
(ii) Spirogyra is a non-motile, isogamous green algae.
(iii) Botrycoccus oils used as feed stock for hydrocracking in an oil refinery to produce octane (Gasoline) kerosene and diesel.

154. Hormogonia are vegetative reproductive structure of
(a) Spirogyra (b) Ulothrix
(c) Oscillatoria (d) Yeast

BHU PMT (Mains)-2010, 2006
Manipal - 2002

Ans. (c) : A myxophycean alga called oscillatoria reproduces by hormogonia. They are short broken filaments of trichome, which give rise to new filaments under favourable conditions. They are formed due to formation of separation discs while ulothrix reproduces vegetatively by fragmentation, asexually by non motile resting spore.

155. Agar-agar which is used in tissue culture is obtained from a:
(a) fungi (b) algae
(c) pteridophyte (d) bryophyte

BVP-2002
Karnataka CET-2000

Ans. (b) : Agar is a biological polysaccharide that is made by extracting seaweed from the ocean. The agar that was produced is a five uniform powder. In order to bind essential nutritional requirements into a growth medium for in vitro plant growing and development. agar is employed in plant tissue culture. The perfect conditions for these habitats are Provided by its strong binding strength and low mineral content.

156. Sexual reproduction in Spirogyra is morphologically characterized by :
(a) oogamy (b) anisogamy
(c) isogamy (d) both b and c

BVP-2002

Ans. (c) : Sexual reproduction in spirogyra is morphologically characterised by isogamy. Sexual reproduction of spirogyra involves conjugation, which can be defined as primitive type of isogamy that is known as planogametic isogamy.

157. Which of the following is a character of Rhodophyceae?
(a) Major pigments are chlorophyll –a and chlorophyll -b
(b) Commonly called brown algae
(c) Stored food materials are mannitol and laminarin
(d) Flagellum is absent
(e) Cell wall contains cellulose and algin

Kerala PMT-2012

Ans. (d) : Typically red algae reproduce vegetatively by fragmentation. They can reproduce sexually using non-motile gametes and non-motile spores like monospores. Flagella are therefore not present in Rhodophyceae.

158. The green algae rich in proteins used as food supplements even by space travellers is
(a) Chlamydomonas (b) Volvox
(c) Spirogyra (d) Spirulina
(e) Chlorella

Kerala PMT-2012
AIPMT-1997

Ans. (e) : Chlorella is a protein-rich green algae that is consumed as a food supplement even by space travelers. It is used for the consumption of carbon dioxide provided by the astronauts and the production of oxygen in space craft and also known as is space food.

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159. Choose the correct order of colours with respect to pigments, chlorophyll, phycoerythin and fucoxanthin

(a) Green, Red and Brown
(b) Brown, Green and Red
(c) Red, Green and Brown
(d) Green, Brown and Red
(e) Brown, Red and Green

Kerala PMT-2012

Ans. (a) : Chlorophyll gives plants their green in colour because it does not absorb the green wave length of white light. That particular light wavelength is reflected from plant, so appear green.
Phycoerythrin is a red protein pigment that located in red algae and cryptophytes.
The **fucoxanthin** is the pigment found in brown algae or phaeophyceae.

160. Trichodesmium erythrium which gives colour to red sea is a

(a) Brown alga (b) Green alga
(c) Blue green alga (d) Red alga

AP EAMCET-2014

Ans. (c) : They are often seen to form blooms in polluted waters.
The red sea is named so because of the colour of its water.This colour is due to the blooms formed by the cyanobacteria, *Trichodesmium erythraeum*, which accumulates and muddies the usually transparent water. They appear as a red and pinkish blanket on the surface of the waters. After blooming, the trichodesmium erythraeum die, and they turn the sea redish-brown.

161. Incipient nucleus is present in :

(a) chlorophyceae (b) rhodophyceae
(c) myxophyceae (d) phaeophyceae

BVP-2000

Ans. (c) : The term incipient nucleus describes a nucleus in which the genetic material is not completely encased by a nuclear membrane. Incipient nucleus is not a true nucleus and is also known as nucleoid, it is found in prokaryotes.
● The group Myxophyceae comes under prokaryotes. It is present in myxophyceae which is commonly called as blue green algae.

162. Triphasic life cycle is found in

(a) Chondrus (b) Laminaria
(c) Polysiphonia (d) Macrocystis

AIIMS-1995

Ans. (c) : The life cycle of polysiphonia (red algae) is triphasic and haplodiplontic. Three different phase in the life cycle.
(I) Haploid phases represented by the male and female gametophytes.
(II) Diploid phase represented by carposporophyte (cystocarp).
(III) Diploid phase represented by tetra sporophyte.

163. In which of the following, reticulate chloroplast is found?

(a) Oedogonium (b) Spirogyra
(c) Ectocarpus (d) Ulothrix

AIIMS-1995

Ans. (a) : Reticulate chloroplast is found in oedogonium which belong to class chlorophyceae. The reticular chloroplast is a complex plastid that forms a cylindrical network in the peripheral region of the cells of some green algae. The green filamentous algae oedogenium has reticular chloroplasts that completely encircls the protoplast.

164. Which one of the following is wrong about Chara?

(a) Upper oogonium and lower round antheridium
(b) Globule and nucule present on the same plant
(c) Upper antheridium and lower oogonium
(d) Globule is male reproductive structure

AIPMT-2014
NEET-2013

Ans. (c) : Chara is a multicellular green alga. Sexual reproduction in Chara is oogamous. The male sex organ is called antheridium (**globule**). The female sex organ is called oogonium **(nucule).**
Most species of chara is a monoecious plant i.e. globule (Antheridia) and nucule (oogonium) are present at the node on same plant
• Globule present below the nucule i.e. oogonium are present at upper portion and antheridium is present at lower portion.

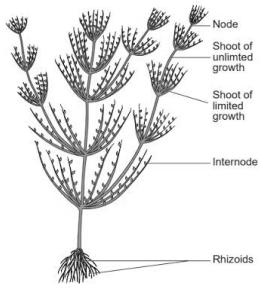


Figure 2.8: *Chara* Habit

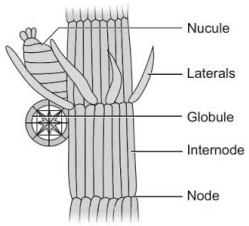


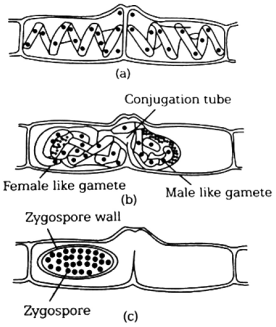
Figure 2.9: *Chara* sex organs

165. Which one of the following shows isogamy with non-flagellated gametes?

(a) Sargassum (b) Ectocarpus
(c) Ulothrix (d) Spirogyra

AIPMT-2014

Ans. (d) : Isogamy with non-flagellated gametes is seen in **spirogyra**. It can reproduce both by sexual and asexual (vegetative) means. They reproduce sexually by conjugation in which two non-flagellated morphologically similar but physiologically different gametes (isogamous) fuse together. One filament acts as male gamete and passes through the conjugation tube of another filament which acts as female gamete.



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166. Which one of the following is an example of chlorophyllous thallophyte?
(a) Volvarialla (b) Spirogyra
(c) Nephrolepis (d) Gnetum
Karnataka CET-2011

Ans. (b) : The members of chlorophyceae are commonly called green algae ;
Some characteristics of chlorophyceae are :
The plant body might be filamentous, colonial, or unicellular. Due to the prevalence of the pigments chlorophyll a and b, they or typically grass-green.
• The pigments are localised in definite chloroplasts. The chloroplasts may be discoid plate like, reticulate, cup-shaped, spiral or ribon-shaped in different species.
• It has one or more storage bodies called pyrenoids located in the chloroplasts.
• Some commonly found green algae are:
Chlamydomonas, volvox, ulothrix, spirogyra and chara.

167. Sexual reproduction in Spirogyra is an advanced feature because it shows: -
(a) Different size of motile sex organs
(b) Same size of motile sex organs
(c) Morphologically different sex organs
(d) Physiologically differentiated sex organs
AIPMT-2003

Ans. (d) : Spirogyra is a freshwater green alga which belongs to class chlorophyceae. The sexual reproduction in spirogyra is called conjugation. It involves the fussion of two morphologically indentical but physiologically dissimilar non-ciliated gametes. For development of gametes, some of the cell start to act like male and female gametangia in which the cell contents become separated from the cell wall.
Shrink and ultimately forms gametes. The fusion of these gemetes takes place by scalariform conjugation or lateral conjugation.

168. Ulothrix filaments produce
(a) heterogametes (b) basidiospores
(c) isogametes (d) anisogametes
AIPMT-1997
BVP - 2001

Ans. (c) : Ulothrix is member of class chlorophyceae. The member of class chlorophyceae are commonly called green algae. Vegetative reproduction usually takes place by fragmentation or by formation of different types of spores.
The Ulothrix sexually reproduces by biflagellate gametes. The isogametes of Ulothrix are biflagellate. Their size is even smaller than micro zoospores.

169. Brown algae is characterised by the presence of
(a) fucoxanthin (b) haematochrome
(c) phycocyanin (d) phycoerythrin
AIPMT-1997

Ans. (a) : The members of phaeophyceae (Brown algae) are found primarily in marine habitate. They show great variation in size and form. They possess chlorophyll a,c carotenoids and xanthophylls.
They vary in colour from olive green to various shades of brown, depending upon the amount of the xanthophyll pigment, fucoxanthin present in them.

170. The pyrenoids are made up of
(a) proteinaceous centre and starchy sheath
(b) core of nucleic acid surrounded by protein sheath
(c) core of protein surrounded by fatty sheath
(d) core of starch surrounded by sheath of protein
UPCPMT-2011
JIPMER-1996
AIPMT-1995, 1993

Ans. (a) : Pyrenoids are tiny sub cellular compartments that can be found in the chloroplast of a variety of algae and land plants. Pyrenoids are linked to a process that concentrates carbon. Their major job is to create and maintain a CO_2 rich environment around RubisCo so that they can operate as centers of CO_2 fixation. Even when starch is produced in the cytosol as opposed to the chloroplast, a starch sheath is frequently generated or deposited at the edge of pyrenoids.

171. In Chlorophyceae, the mode of sexual reproduction is
(a) isogamy (b) anisogamy
(c) oogamy (d) all of these
AIPMT-1994
JIPMER-2004
Punjab MET-2003

Ans. (d) : In chlorophyceae the mode of sexual reproduction is either isogamaus or anisogamous or oogamous with specilised reproductive cells.
Isogamous :- The fusing gametes are morphologicaly similar but physiologicaly differ called isogametes one represented by positive strain and other negative strain. Both fuse to form 2n zygospore. It is simplest and most primitive type as ulothrix chlamydomonas, spirogyra etc.
Anisogamous: The fusing gametes morphologicaly and physiologicaly dissimilar called anisogametes small gamete is more active and large gamete is less active. Both fuse to form diploid zygote as *chlamdomonas braunii, Eudorina.*
Oogamous : It is advanced type sexual reproduction.
• Sex organ well developed, male sex organ called antheridia produced many motile male gametes called sperm, female sex organ called oogonium produced single large non motile female gamete called egg retained within the oogonium.

172. Chloroplast of Chlamydomonas is
(a) stellate (b) cup-shaped
(c) collar-shaped (d) spiral
AIPMT-1993

Ans. (b) : Chloroplast of chlamydomonas is cup-shaped . Chlamydomonas cells are ~10µm in diameter and about half of their volume is occupied by a single cup-shaped chloroplast where as, in spirogyra, the chloroplasts are spiral and ribbon like.

173. In Ulothrix/Spirogyra, reduction division (meiosis) occurs at the time of
(a) gamete formation
(b) zoospore formation
(c) zygospore germination
(d) vegetative reproduction
AIPMT-1993

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Ans. (c) : Ulothrix and spirogyra is the members of chlorophyceae. It is green algal species. In spirogyra and ulothrix two isogametes from two different filaments come together and fuse by their anterior end to form zygospore.
At the time of zygospore, germination meiosis takes place in ulothrix / spirogyra under favorable conditions, zygospore, undergoes, zygotic meiosis to form motile tetra - flagellated meiospores or non- motile aplanomeiospores each meiospore (haploid) germinates to the new filaments of positive and negative strain.

174. The common mode of sexual reproduction in Chlamydomonas is
(a) isogamous (b) anisogamous
(c) oogamous (d) hologamous
AIPMT-1991

Ans. (a) : The common mode of sexual reproduction in chlamydomonas is isogamous.
Chlamydomonas has both asexual and sexual reproduction.
While sexual reproduction can be isogaus, anisogamous, or oogamous, asexual reproduction occurs through zoospores.
However, fusion frequently occurs between similor gametes, leading to isogamy as the method of reproduction.
Isogamy- It is a primitive type of sexual reproduction occurs in lower forms. The fusing gametes are morphologically similar in size, form and structure and are called isogametes. Isogamous sexual reproduction is common in some species of chlamydomonas.

175. The product of conjugation in Spirogyra or fertilization of Chlamydomonas is
(a) zygospore (b) zoospore
(c) oospore (d) carpospore
AIPMT-1991

Ans. (a) : Zygospore is the end result of conjugation in spirogyra or fertilization in chlamydomonas. Both are members of the green alga family in which gametes combine to produce zygotes, which then grow into zygospores with strong walls.

176. Which one of the following formed in Spirogyra is different based on its nucleus ?
(a) Zygospore (b) Azygospore
(c) Aplanospore (d) Akinete
AP EAMCET-2008

Ans. (a) : Asexual bodies in spirogyra include akinetes and aplanospores.
Zygospore-Zygospore is formed during sexual reproduction by fusion of two protoplasts. Prior to germination the diploid zygospore nucleus under goes meiosis.
Azygospore- A reproductive body found in certain fungi (Class phycomycetes) and in some algae that resembles azygospore but is formed without gametic fusion.
Aplanospore – A non motile asexual spore formed by rejuvenescene in certain algae and distinguished from an Akinete by developing a new cell wall distinct from that of the parent cell-compare hynospore, zoospore.
Akinete – An akinete is an envelope, thick-walled, non motile, dormant cell formed by filamentous, heterocyst forming cyanobacteria under the order Nostocales and Stigonematals. Akinetes are resistant to cold and desication.

177. Algae are useful because they
(a) Are large in number
(b) Are used in alcoholic fermentation
(c) Purify the atmosphere
(d) Are used in study of photosynthesis.
AIIMS-2002

Ans. (c) : Algae are useful because they purify the atmosphere. Since form olden days algae species are ultimately connected with human begins as a source food, medicine and other uses algae are the main oxygen producers in aquatic areas.
Algae fall under the kingdom plantae.
Hence they perform all the functions similar to a plant-like photosynthesis.
Since they trap the maximum amount of solar energy. They in turn, produce maximum oxygen. thereby, purifying the atmosphere.

178. In blue-green algae, photosystem-II contains important pigment concerned with photolysis of water. It is a:
(a) Phycocyanin (b) Cytochrome-c
(c) Chlorophyll-b (d) β-carotene
AIIMS-2015

Ans. (a) : In BGA (Blue Green Algae) Photo system-II contains important pigment concerned with photolysis of water. It is **phycocynin or phycoerythrin.**
It is an pigment protein complex found in cyanobacteria.

179. Water blooms are formed by:
(a) Planaktonic algae (b) Lemna
(c) Rhizopus (d) Wolffia
J&K CET-2000

Ans. (a) : Water blooms are formed by planktonic algae. Planktonic algae are microscopic plants that live in every drop of pond water, planktonic algae are important because they produce oxygen and food for the animals that live in the pond.
It forms a layer over the surface of the water. It is promoted by the release of the inorganic and organic compounds in the water body by the agricultural field run off, industrial discharge and untreated sewage. This is called eutrophication because it builds up the substratum of the water body. It depletes the dissolved oxygen level because the decomposing bacteria get activated to breakdown the organic compounds.

180. In chlamydomonas the life cycle:
(a) haplontic (b) diplobiontic
(c) isomorphic (d) haplodiplontic
J&K CET-2000

Ans. (a) : The life cycle of the chlamydomonas is haplontic. This is the simplest and most primitive type of life cycle. The main vegetative plant body is haploid (gametophyte). It bears haploid gametes. The gametic fusion which is known as syngamy produces zygote which is the only diploid phase (sporophyte) in the life cyle.

181. Which of the following algae shows physiological anisogamy?
(a) Spirogyra (b) Ulothrix
(c) Volvox (d) All of these
JCECE-2002

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Ans. (a) : In spirogyra, all filamentous cells have the capacity to develop gametes, sometimes known as isogametes because of their identical morphology.
This phenomena of sexual reproduction is known as isogamous type of sexual reproduction. But at the time of conjugation one of the two isogametes shows motility and is considered as male gamete. This phenomenon is referred to as physiological anisogamy.

182. Which one set of genera are correctly matched?
(a) Chlorophyceae- Volvax, Laminaria, Fucus
(b) Phaeophyceae- Laminaria, Chlamydomonas
(c) Rhodophyceae- Gelidium, Gracilaria
(d) Phaeophyceae- Laminarea, Sargassum, Ulothrix

BVP-2014

Ans. (c) :
Rhodophyceae includes - Geliduim, Gracilaria, Porphyra and Polysiphonia.
Where as chorophyceae includes - Chlorella, Chlomydomonas, Spirogyra, Chara, Volvox, Ulothrix, phaeophyceae includes - kelp, Sargassum, Laminaria etc.

183. There exists a close association between the alga and the fungus within a lichen. The fungus
(a) fixes the atmospheric nitrogen for the alga
(b) provides protection, anchorage and absorption for the alga
(c) provides food for the alga
(d) releases oxygen for the alga

Uttarakhand PMT-2010

Ans. (b) : There exists a close association between the alga and the fungus with in a lichen. The fungus provides protection anchorage and absorption for the alga and blue green algae provide food and nutrition obtained by photosynthesis.

184. In Spirogyra, a brief period of tetranucleate condition is found in–
(a) hold fast (b) gametangium
(c) vegetative cell (d) germinating zygote

Uttarakhand PMT-2010

Ans. (d) : Spirogyra is an examples of chlorophyceae and sexual reproduction takes place through the fusion of two morphologically identical but physiologically dissimilar non- ciliated gametes. The fusion of both kinds of gametes results into formation of zygospores. The germinating diploid zygospores undergoes meiosis to maintain the haploid condition.
Thus, in the condition tetranucleate condition is found for a brief period of time.

185. Phycology is the study of
(a) algae (b) fern
(c) fungi (d) bryophytes

AMU-2009
Punjab MET-2008

Ans. (a) : 'Phycology' is the study of algae.
- Pteridology– The study of pteridophytes.
- Bryology– The study of bryophytes.

Mycology– The study of Fungi.

186. A ring of multicilliate zoogonidium is found in
(a) Ulothrix (b) Zygnema
(c) Oedogonium (d) Chara

Punjab MET-2007

Ans. (c) : The alga oedogonium contains a ring of multinucleotide zoogonidium. A zoogonidium is a photosynthetic cell in an algae that contains spores for reproduction. The zoospores are enclosed in a zoosporangium produced on the vegetative cells. The zoospores have a ring of flagella on the base. The zoospores are released from the vesicles and they float freely for some time to find a substratum and start dividing to form filaments once they find a substratum.

187. In Spirogyra during the germination of zygospore how many haploid nuclei takes part?
(a) Three (b) Two
(c) One (d) All four

JIPMER-2002

Ans. (c) : Spirogyra is a genus of filamentous charophyte green algae commonly known as water silk. It is very common in relatively clear eutropic developing slimy filamentous green masses.
Zygospore is a triple layered with brownish-orange coloured outer layer. Zygospores in the bottom of pond rest till the return of favorable season. During germination, zygospore nucleus divides meiotically and out of four daughter nuclei formed three disintegrate, leaving only one haploid Nucleus. The zygospore germinates, the two outer cost line burst and a new filament is formed.

188. Which of the following groups of algae do not have eukaryotic organization ?
(a) Blue green algae (b) Green algae
(c) Golden brown algae (d) Red algae

Karnataka CET-2005

Ans. (a) : Blue green algae do not have eukaryotic organization. Blue green algae are also called cyanobacteria. They are prokaryotes and also lack membrane-bound organelles like mitochondria, Golgi apparatus etc.
Ex. Anabaena, Nostoc

189. Algae have cell wall made up of –
(a) Cellulose, galactose and mannose
(b) Hemicellulose, pectins and proteins
(c) Pectins, cellulose and proteins
(d) Cellulose, hemicellulose and pectins

AIPMT (Screening)-2010

Ans. (d) : Algae include in kingdom plant cell wall is composed by cellulose, hemicellulose and pectins but the cell wall of blue green algae (cyanobacteria) is composed by peptidoglycan which is a prokaryotes placed under the kingdom Monera.

190. PGA as the first CO_2 fixation product was discovered in photosynthesis of –
(a) Bryophyte
(b) Gymnosperm
(c) Angiosperm
(d) Algae

AIPMT (Screening)-2010

Ans. (d) : Calvin worked on algae chlorella and Scenedesmus with radioactive ^{14}C in carbon dioxide.
- The path of CO_2 fixation was traced when algal suspension was illuminated and photosynthesis was carried out with normal carbon dioxide was supplied CO_2.

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The algae was killed by the methanol at its boiling temperature. It immediately stopped photosynthesis activity due to denaturation of enzymes.
Alcohol was evaporated and after crushing the algae the product was made into paste. The paste was placed on paper chromatography and the different compound were separated by two dimensional chromatography.
- The radioactive compounds were identified by comparing their position on the chromatogram with standard chemicals. After three seconds, radioactivity appeared in phosphoglyceric acid or PGA.
Therefore the first stable product of phostosynthesis.

191. In Spirogyra sometimes a ladder like structure is present due to:
(a) vegetative reproduction
(b) asexual reproduction
(c) lateral conjugation
(d) scalariform conjugation

JIPMER-2004
Punjab PMT - 2003
Punjab MET-2003

Ans. (d) : Sexual reproduction in spirogyra occurs by conjugation. Scalariform conjugation occurs between cells belonging to different filaments. Therefore, these species are heterogametic. Lateral conjugation is primitive compared to scolar conjugation.

192. Mannitol is reserve food in
(a) Rhodophyceae
(b) Chlorophyceae
(c) Phaeophyceae
(d) Xanthophyceae

JIPMER-2004
PUNJAB - MET - 2003
AIPMT - 2009

Ans. (c) : The Phaeophyceae class included brown algae. Brown algae are marine plants. In Phaeophyceae, reserve food material is mannitol and laminarin.

193. Assertion (A) : K^+ ion accumulation found in Nitella depends on its respiratory activity.
Reason (R) : Absorption of all ions in plants completely depends on the usage of metabolic energy.
The correct answer is
(a) (A) and (R) are true and (R) is correct explanation of (A)
(b) (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2007

Ans. (c) : In **Nitella,** potassium is accumulated passively by both the cytosol and the vacuole, except when extra cellular K^+ concentrations are very low, in which case it is taken up actively.
In plants, not all ions are absorbed due to the use of metabolic energy.

194. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses:
(a) Mode of Nutrition
(b) Multiplication by fragmentation
(c) Diplontic life cycle
(d) Members of kingdom plantae

AIPMT (Screening)-2012

Ans. (b) : Multiplication by fragmentation is common among filamentous algae and protonema of mosses all show multiplication by fragmentation.
Fragmentation is mode of asexual reproduction that involves breaking the parent body into several fragments and each fragments fungi, filamentous algae and protonema of mosses show the fragments.

195. Which one of the following is wrongly matched?
(a) *Nostoc*-Water blooms
(b) *Spirogyra*-Motile gametes
(c) *Sargassum*-Chlorophyll C
(d) Basidiomycetes-Puffballs

NEET (Karnataka)-2013

Ans. (b) : Spirogyra is belong to class chlorophyceae is known as fresh water green alga the sexual reproduction in spirogyra, gametes are non-motile and sexual reproduction takes place by Conjugation.
- Sargassum belongs to phaeophyceae which contains chlorophyll-a and Chlorophyll-c.
- Basidiomycetes include puffballs, Mushroom etc.
- Nostoc is a colonial cyanobacteria which causes algal bloom.

196. Specialized cells for fixing atmospheric nitrogen in Nostoc are
(a) Akinetes
(b) Heterocysts
(c) Hormogonia
(d) Nodules

NEET (Karnataka)-2013

Ans. (b) : Nostoc and anabaena atmospheric nitrogen fixation by a specialized cells known as heterocyst.

197. True statement for *Ulothrix* :
(a) Filamentous thallus and flagellated reproductive structures
(b) Branched thallus
(c) Flagellated cells absent
(d) None of the above

AIPMT-1998

Ans. (a) : The thallus of ulothrix is filamentous, long, unbranched and multicellular, where the cells are arranged in a single row (i.e uniseriate).
- The filamentous are bright green in colour and remain attached at one end with the substratum such as stones, rocks or some other solid object.

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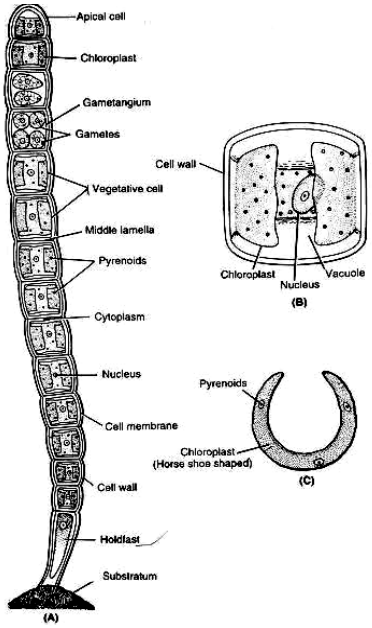

198. How many zygospores are formed in a 100 celled filament of Spirogyra affinis, if all cells are involved in conjugation?

(a) 99 (b) 50
(c) 49 (d) 1

AP EAMCET-2010

Ans. (b) : 50 zygospore are formed in a 100 celled filament of **Spirogyra affinis**, if all are involve in conjugation.

199. Assertion : Red algae contribute in producing coral reefs.
Reason : Some red algae secrete and deposit calcium carbonate over their walls.

(a) Both Assertion and Reason are true and Reason is the correct explanation of the Assertion
(b) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion
(c) Assertion is true, but Reason is false
(d) Both Assertion and Reason are false

AP EAMCET-2011

Ans. (a) : Calcium carbonate causes the cell walls to harden. thus, these algae are crucial far the development of coral reefs. Coral reefs are formed through the accumulation of calcareous exoskeletons of coral animal, calcareous red algae and mollusks. By secreting a calcium carbonate skeleton that protects the coral polyps, they lay the groundwork for reefs. The coral colony continuously secretes calcium carbonate.

200. Indentify the type of flagellum in Monas Urceolus and Polytoma in their sequential order from the following

(A) The flagellum is stichonematic.
(B) Two or more rows of lateral appendages
(C) The flagellum is pantacronematic.
(D) Lateral appendages are absent and axoneme ends as naked axial filament.

(a) A, B, D (b) A, C, D
(c) B, A, C (d) B, C, D

AP EAMCET-2008

Ans. (d) : Monas has pantacronematic flagellum with two or more rows of lateral appendages on the axoneme. Lateral appendages are absent in Polytoma. Pantacronematic flagellum is found in Urceolus.

201. Match the storage products listed under Column-I with the organisms given under Column-II; choose the appropriate option from the given choices.

Column-I	Column-II
A. Glycogen	p. Sargassum
B. Pyrenoids	q. Nostoc
C. Laminarin and mannitol	r. Polysiphonia
D. Floridean starch	s. Spirogyra
	t. Agaricus

(a) A-r, B-s, C-p, D-t (b) A-s, B-r, C-t, D-q
(c) A-t, B-s, C-p, D-r (d) A-q, B-p, C-s, D-r

Karnataka CET-2014

Ans.(c) :

Storage product	Organism
A. Glycogen	**T.** Agaricus
B. Pyrenoids	**S.** Spirogyra
C. Laminarin and mannitol	**P.** Sargassum
D. Floridean starch	**R.** Polysiphonia

(A) Glycogen:– In the glycogen large number of dense granular glycogen particles, a stored food material in fungi such as agaricus.
(B) Pyrenoids:– It occurs in many of large and associated with the chloroplast. They are present in spirogyra as well as green plant.
(C) Laminarin and monnitol:– Food reserve of sargassum is laminarian and mannitol.
(D) Floridean Starch:– The food is stored in the form of floridean starch in polysiphonia.

202. Assertion (A) : In Spirogyra, some cells in one of the two filaments become empty after conjugation.
Reason (R) : The aplanogametes from the cells of one filament pass through the conjugation tubes into the cells of the other filament.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2005

Ans. (a) : Sexual reproduction is Spirogyra is known as **conjugation**. In this process one cell, called **gametangium**. Function as female and receive male gamete of adjacent cell, called **aplanogamete** which is simply a non-Flagellated mass of protoplasm formed in the aplanogametangium. This transfer of aplanogametes to gametangium leave behind an empty cell. Here assertion and reason both are correct and reason is correct explanation of assertion.

203. If you are asked to classify the various algae into distinct groups, which of the following characters you should choose ?

(a) Chemical composition of the cell wall
(b) Types of pigments present in the cell

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(c) Nature of stored food materials in the cell
(d) Structural organization of thallus

AIPMT-2007

Ans. (b) : Different types of pigment present in different group of algae. These are primarily basis of classification of algae. Most of the algal species have the same chemical composition in the cell wall and the same photosynthetic pigment.

Ex:- Chlorophyll a, b,
Carotenoids etc.

Classes	**Common name**	**Major pigments**
Chlorophyceae	Green algae	Chlorophyll a,b
Phaeophyceae	Brown algae	Chlorophyll a, c Fucoxanthin
Rhodophyceae	Red algae	Chlorophyll a,d, r-phycoerythrin
Cyanophyceae,	Blue green algae	Chloropyll a, c- phycocyanin c- phycoerythrin

204. The lower most cell of filamentous algae Ulothrix is characterised by
(a) Devoid of chlorophyll and enucleated
(b) Presence of nucleus and non-chlorophylls
(c) Presence of chlorophyll and nucleated
(d) Absence of chlorophyll and enucleated

UP CPMT-2014

Ans. (b): The lower most part of ulothrix algae is holdfast. This lower most cell of algae contain nucleus but it is a non-chlorophylls structure. Hence, the absence of chlorophyll, in the lowermost cell of ulothrix shows the beginning of labor division.

205. Smallest plant which contain green pigment such as higher green plant is
(a) Schizomycetes
(b) Rhodophyceae
(c) Chlorophyceae
(d) Phaeophyceae

UPCPMT-2002

Ans. (c) : Chlorophyceae is a very significant and sizable class of green algae. Members might be filamentous, colonial, or unicellular.

•The main features of the class (and most plant) are the use of starch as the principal food reserve and the green chloroplast with chlorophyll a and b.

•Schizomycetes is a class of unicellular or noncellular organism that lack chlorophyll, comprise all the bacteria, and are prokaryotes, although formerly classified as fungi.

vRhodophyceae (red algae) is of class a marine algae, most of them red in colour, whose basic shape is filamentous or membraneous. They tend to occur at greater depths than the green algae.

• **Phaeophyceae** – The brown algae comprising the class phaeophyceae, are a large group of multicellular algae, including many seaweeds located in cold water within the northern hemisphere

206. Match the following list

List I		**List II**
(A) Anucleate	(i)	Spirogyra gametangium
(B) Uninucleate	(ii)	Rhizopus chlamydospore
(C) Multinucleate	(iii)	Pteris neck canal cell
(D) Binucleate	(iv)	Vitis matured sieve element
	(v)	Akinite of Spirogyra

The correct match is

	A	B	C	D
(a)	(i)	(iv)	(v)	(ii)
(b)	(iv)	(i)	(iii)	(ii)
(c)	(i)	(iii)	(ii)	(iv)
(d)	(iv)	(i)	(ii)	(iii)

AP EAMCET-2013

Ans. (d): Anucleate- The sieve cells of the phloem of angiosperms like vitis are living cells. But at maturity they lake the nucleus called anucleate.
Uninucleate- The gametangium of spirogyra has single nucleus between the plant body of spirogyra is haploid undifferentiated and gametophytic. The gametes are produced in gametebearing cells of the thallus.
Multinucleate- Rhizopus belongs to the phycomycetes class of kingdom fungi. The body organization is like a fine thread called hyphae. Several hyphae come together to form a network called mycelium. The hyphae are coenocytic, aseptate and branched have many nuclei.
Binucleate- The neck canal cells of ferns like pteris are generally binucleate. There is a cylindrical neck consisting of the neck canal cell and the swollen ventre.

Thus, the correct option is (d).

207. Identify the correct pair of combination
(I) Chara - Monoecious – Chlorophyll a, b
(II) Salvinia – Homosporous – Free floating hydrophyte
(III) Ectocarpus – filmentous form – Chlorophyll a, d
(IV) Laminaria– Biflagellate gametes – Haplo - diplontic life cycle
(a) (II) , (III) (b) (I) , (IV)
(c) (I), (III) (d) (III), (IV)

TS EAMCET-2015

Ans. (b) : (i) Chara- Chara belong to the member of chlorophyceae are commonly called green algae. It is monosporous in nature and contains a pigments chlorophyll a and b.
(ii) Salvinia- Salvinia is a most popular free floating hydrophytes. It is heterosporous in nature.
(iii) Ectocarpus- It is a brown algae. They possess chlorophyll a and c.
Ectocarpus is a example of simple branched filamentous algae.
(iv) Laminaria- It is brown algae have biflagellate gametes and haplo diplontic type life cycle.

208. Select the wrong statement.
(a) The walls of diatoms are easily destructible
(b) 'Diatomaceous earth' is formed by the cell walls of diatoms
(c) Diatoms are chief producers in the ocean
(d) Diatoms are microscopic and float passively in water

NEET-2016 Phase-II

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Ans. (a) : Chrysophytes (Protist) group includes diatoms and golden algae (desmids).
- They are microscopic and float passively in water.
- Diatomaceous earth is made from the fossilized remains diatoms frustules. These frustules are made up of Nano-silica SiO_2. Thus walls are indestructible.

209. Experiment to demonstrate importance of nucleus in the controlling growth and heredity were performed on :
(a) Acetabularia (b) Neurospora
(c) eucocytes (d) star fish

BVP-2006

Ans. (a) : Dr. J. Hammerling (1980) a German biologist who determined that the nucleus of a cell controls the development of organisms. His experimentation with the green algae Acetabularia prove that all the hereditary or genetic information is enclosed inside a nucleus. Concluded that the nucleus controls all the metabolic activities that take place in the cytoplasm of the cell.

210. Reserve food material of algae is :
(a) starch (b) glycogen
(c) fat (d) sugar

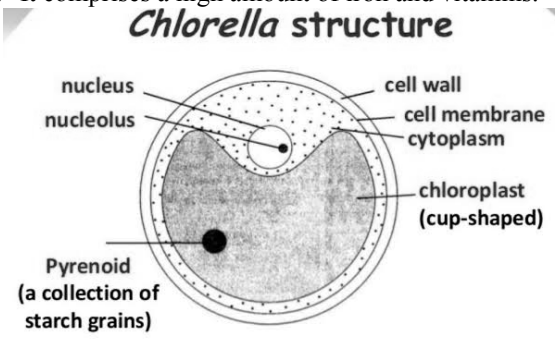
BCECE-2005

Ans. (a) : Algae are mostly aquatic (Freshwater and marina) simple, thalloid, autotrophic organisms that certain chlorophyll.
The algae reserves food material are starch, mannitols, laminarin, floridian starch.

211. Algae used in space programme is:
(a) Diatom (b) Dinoflagellates
(c) Chlamydomonas (d) Chlorella

BHU PMT-2003

Ans. (d) : Chlorella is a green algae, that has existed on earth for over 2.5 billion years. It is also known as space alga. It is used for the consumption of carbon dioxide provided by the astronauts and the production of oxygen in the Spacecrafts. The features that makes the Chlorella, the space alga are as follows:
→ Chlorella is a very good source of food which is rich in protein nutrient.
→ It can be grown very easily.
→ It comprises a high amount of iron and vitamins.



212. Phycocolloids are obtained from
(a) brown algae (b) breen algae
(c) blue- green algae (d) diatoms

UP CPMT-2010

Ans. (a) : The cellulose wall brown algae is covered in a colloidal layer made up of a variety of polysachrides referred to as phycocolloids. Example, alginic acid, algin, fucoidin and fucin. These prevents drying or freezing in water when algae are exposed to air during low tides and protect cells when waves beat them against the rocks.

213. Pigments common to all algae are
(a) chlorophyll-a and phycobilins
(b) chlorophyll-a and carotenoids
(c) chlorophyll-a and chlorophyll-b
(d) chlorophyll-b and carotenoids

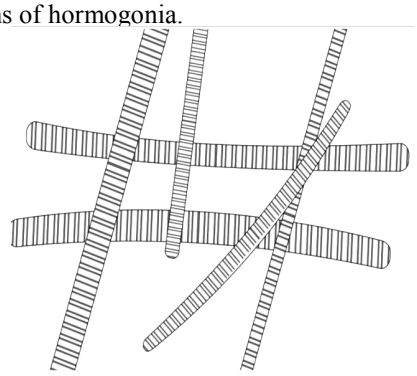
BVP-2012
MGIMS Wardha-2007

Ans. (b) : In algae, the chlorophyll- a pigment performs photosynthesis. Carotene is also a pigment that can trap radiant energy and convert into chemical energy. It appears to be a yellow color.
chlorophyll-a acts as a reaction center and carotene shows a wide range of light absorption for photosynthesis.
Chlorophyll a → $\mathbf{C_{55}H_{72}O_5N_4Mg}$
β Carotene → $\mathbf{C_{40}H_{56}}$

214. Hormogonia are vegetative reproductive structures of
(a) Ulothrix (b) Oscillatoria
(c) Spirogyra (d) Chara

Manipal-2012

Ans. (b) : • Ulothrix reproduces vegetatively by fragmentation.
• The mode of reproduction in chara is oogamous type.
• Spirogyra reproduces asexually by fragmentation.
• Oscillatoria is a myxophycean alga which reproduces by means of hormogonia.


HORMOGONIA IN OSCILLATORIA

215. Zygotic meiosis occurs in
(a) Pinus (b) Marchantia
(c) Dryopteris (d) Chlamydomonas

Manipal-2011

Ans. (d) : In chlamydomonas, zygotic meiosis is found. Chlamydomonas belogns to class chlorophyceae, it is unicellular grass green due to the dominance of pigment chlorophyll **a** and **b**.

216. In algae, the bacteriological filter is :
(a) Oscillatoria (b) Batrachospermum
(c) Nostoc (d) Cosmarium

AFMC -2011

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Ans. (d) : Cosmarium belongs to green algae. The cell membrane of cosmarium is highly porous which can filter small organisms such as bacteria. Hence, it is used as a bacteriological filter. Two semi cells of Cosmarium are joined by the isthmus where the nucleus is present. It moves by mucilage propulsion as it absorbs water and swells which propels the cell to move forward.

217. Presence of basal rhizoidal cell in Ulothrix is an example of
(a) dead cell
(b) vestigial cell
(c) accessory cell
(d) beginning of division of labour

BHU PMT (Mains)-2009

Ans. (d) : The advanced alga uloturix has three different cell types; a green dome - shaped apical cell, a green intercalary cell, and a basal non-green intercalary cell.
Basal cell is non green but has nucleus and cytoplasm.
Its presence shows the beginning of the division of labour.

218. The plants of Cladophora crispata occur as :
(a) epiphyte (b) endophyte
(c) endozoic (d) epizoic

BHU PMT (Mains)-2005

Ans. (d) : Cladophora crispata is a type of green algae with branched filament that is known to live on the shells of snails. Because of the use of an animal as a place to live and grow, therefore, cladophora crispata is considered to be an epizoic plant.

219. Comparable to angiosperms, which of the following algae exhibits diplontic life cycle?
(a) Spirogyra (b) Ectocarpus
(c) Polysiphonia (d) Fucus

DUMET-2010

Ans. (d) : A brown alga known as fucus (rockweed) exhibits a diploid life history that is comparabt to that of angiosperms.
Spirogyra, Volvox exhibits haplontic pattern of life cycle whereas Ectocarpus, Polysiphonia & kelp are haplo-diplontic.

220. Chloroplasts of Spirogyra have:
(a) spiral margin
(b) smooth or waxy margin
(c) smooth margin
(d) none of the above

HP CET-2011
BCECE-2006

Ans. (b) : In Spirogyra, chloroplasts are ribbon, shaped serrated or scollped, and spirally organized. The margin of chloroplasts may be smooth or wavy or serrated. The Spirogyra chloroplasts are long, spirally coiled ribbon, smooth and may contract to form a rod structure.

221. Which one of the following classes is not a representative of green - algae?
(a) Chlorophyceae (b) Charophyceae
(c) Euglenophyceae (d) Chrysophyceae

MGIMS Wardha-2013

Ans. (d) : Chlorophyceae, Charophyceae and Euglenophyceae are representative of green algae. Chrysophyceae of class- algae is the representative of orange or brown algae. They are often called as **chrysophytes**. They are mostly found in freshwaters.
They are sometimes referred to as golden-brown algae due to their coloration from specific photosynthetic pigments. They are often unicellular and have a flagellum which allow them to move in water.

222. Major pigments found in Phaeophyceae, i.e. brown algae are
(a) chlorophyll a, d
(b) chlorophyll a, b, c
(c) chlorophyll a, c and fucoxanthin
(d) chlorophyll a, d and phycoerythrin

HP CET - 2013
J&K CET-2014

Ans. (c) : The phaeophyceae possess chlorophyll a, c carotenoids and xanthophylls. Fucoxanthin, a type of xanthophyll is present in brown algae.

223. Which of the following is obtained from algae?
(a) Carrageenan (b) Chocolate
(c) Butter (d) Wax

CMC Ludhiana - 2007
VMMC-2002

Ans. (a) : Carrageenan is a polysaccharide which is obtained from red algae *Chondrus crispus* (Iris mass). It is hydrocolloid (water holding substance).
Carrageenans are used in emulsion stabilization, for syneresis control and for binding and dispersion. Major uses are in foods and dairy application.

224. Mannitol is a stored food material found in members of which of the following classes?
(a) Chlorophyceae (b) Xanthophyceae
(c) Rhodophyceae (d) Phaeophyceae

J&K CET-2012

Ans. (d) : Mannitol is type of stored food present in Phaeophyceae, also known as brown algae. Mannitol is a form of complex carbohydrate stored as food in some definite algae.
Mannitol represents the major end product in these algae and is the main form of carbon storage. It is formed by reduction of fructose-6-phosphate.

225. If you are asked to classify the various algae into distinct groups, which of the following characters you should choose?
(a) Types of pigments present in the cell
(b) Nature of stored food materials in the cells
(c) Structural organization of thallus
(d) Chemical composition of the cell wall

Rajasthan PMT-2010

Ans. (a) : Algae are a group of chlorophyllous, non vascular plants with thallose plant body. Different algae show different pigments present in the cell like chlorophyll- a, b, xanthophylls, carotenes, etc. These pigments provide the base for classification.
The algae are divided into three main classes -
Chlorophyceae, Phaeophyceae and Rhodophyceae
Chlorophyceae : - They are usually grass green due to the dominance of pigments. Chlorophyll **a** and **b** e.g. - *Chlamydomonas, Volvox, Ulothrix, Chara, Spirogyra* etc.

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Phaeophyceae : - They posses chlorophyll **a, c Carotenoids** and **Xanthophylls**. They vary in colour from olive green to various shades of brown depending upon the amount of the Xanthophyll pigment, Fucoxanthiin present in them. e.g. *Laminaria, Sargassum, Fucus* etc.
Rhodophyceae :- The members of Rhodophyceae are commonly called red algae because of the predominance of the red pigment, ***r-phycoerythrin*** in their body. e.g. *Porphyra, Gracilaria, Gelidium.*

226. Solar energy transducer is
(a) Agaricus (b) Rhizobium
(c) Orobanche (d) Chlorella
AMU-2011

Ans. (d) : Solar energy transducer is Chlorella. Chlorella is a green algac, which contain chlorophyll a and b in chloroplast. It traps the daylight and converts the sun based energy obtained by the sun to synthetic energy.

227. Algae which are called gulf weed are
(a) Chlamydomonas (b) Volvox
(c) Chara (d) Sargassum
AMU-2011

Ans. (d) : Saragassum is a brown algae, which is known as gulfweed or holly sea. The genus sargassum, having air bladders and forming dense floating masses in tropical atlantic water. It is used both as manure and fodder.

228. Like angiospermic parasite such as Cuscuta, there are some parasitic forms of Rhodophyta, which are colourless, heterotrophic and grow on other members of Rhodophyta. Select which one is a parasitic form of red algae ?
(a) Gelidium (b) Harveyella
(c) Choridras (d) Both (a) and (b)
AMU -2000

Ans. (b) : Rhodophytes are also known as red algae, which is a eukaryotic alga without flagelate. Around 7000 living species are known till now. Majority of the red algae are marine with greater concentrations found in the warmer areas, most of them are autotrophic except Harveyella which is colourless parasitic red algae. Most Harveyella are parasitic over Polysiphonia.

229. The commercially exploited algae include
(a) Caulerpa, Chara and Volvox
(b) Gelidium, Laminaria and Porphyra
(c) Acetabularia, Spirogyra and Ulothrix
(d) All of the above
AMU-1999

Ans. (b) : The commercially exploited algae include Gelidium, Laminaria, Porphyra. Laminaria is used in the manufacture of iodine and Gelidium in the production of agar.
Porphyra tenera (Red algae) is used as flavoring agent in soups and salads.

230. The red colour of rhodophyta is due to the preponderance of
(a) phycobilins (b) phycocyanin
(c) phycoerythrin (d) none of these
AMU-1999, 2012

Ans. (c) : Red colour of rhodophyta is due to the preponderance of phycoerythrin. Majority of the red algae are marine with greater concentrations found in the warmer areas. E.g. Polysiphonia, Porphyra, Gracilaria and gelidium.

231. A protein rich green alga is:
(a) Chlorella (b) Ulothrix
(c) Spirogyra (d) Volvox
MGIMS Wardha-2004
UP CPMT-2004

Ans. (a) : Chlorella is a type of freshwater green algae, which contains protein, iron, vitamins B and C, and other antioxidants. It is used as food suppliment by space travellar.

232. Cell wall of red algae contains:
(a) cellulose
(b) cellulose + alginic acid
(c) cellulose + pectin
(d) no cell wall
HP CET-2013

Ans. (c) : Algae have cell wall, made of cellulose, galactans, mannans and minerals like calcium corbonate. Red algae are classified as Rhodophyta. The cell wall composition of members belonging to class Rhodophyceae, are made up of cellulose, Pectin and a variety of polysaccharides.

233. Cell wall of green algae is made up of :
(a) cellulose (b) chitin
(c) glycogen (d) muramic acid
Rajasthan PMT-1998

Ans. (a) : Green algae are usually green grass due to the dominance of pigment chlorophyll **a** and **b.**
The cell wall of green algae is mode of an inner layer of cellulose and an outer layer of pectin.

234. Hold fast cell of Ulothrix shows as a :
(a) companion cell (b) dead cell
(c) division of labour (d) none of these
Rajasthan PMT-1998

Ans. (c) : Ulothrix is a genus of filamentous green algae found in marine and fresh water.
• The specialized cell for attachment is called the holdfast, and the filaments are typically unbranched.
Holdfast or basal cell is for attachment, for attachment, it has a nucleus and cytoplasm. Its presence shows the beginning of the division of labour.

235. Laminaria (kelp) and Fucus (rock weed) are the example of
(a) green algae (b) brown algae
(c) red algae (d) golden brown algae
UP CPMT-2001

Ans. (b) : The members of phaeophyceae or brown algae are found primarily in marine habitate. They show great variation in size and form. Laminaria is also known as kelp. It is the largest and the most complex of the class of algae. Laminaria and Fucus have a xanthophyll pigment called the fucoxanthin which provides the characteristic color to them. Laminaria (kelp) and fucus (rock weed) are the example of brown algae.

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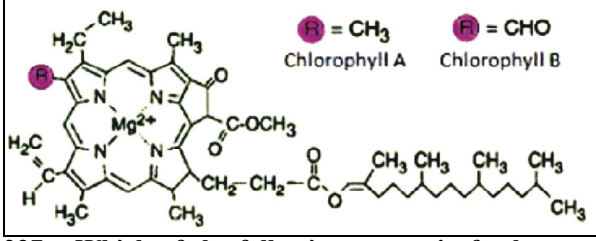
236. Chlorophyll - b differs from chlorophyll - a in that it does not have
(a) CHO (b) COOH
(c) CH_3 and - CH (d) None of these
BVP-2013
CG PMT-2007

Ans. (a) : Chlorophyll is a green color pigment that is found in the leaves of the plant. Two forms of chlorophyll- a and b present themselves with various difference between them.
Chlorophyll-a differs from chlorophyll-b in that chlorophyll-a has a methyl ($-CH_3$) group while chlorophyll-b has a aldehyde group (-CHO) in place of a methyl group.



237. Which of the following occurs in fresh as well as marine water?
(a) Spirogyra (b) Cladophora
(c) Oedogonium (d) None of the above
Uttarakhand-2005

Ans. (b) : Cell wall of green algae is made up of cellulose and calcium corbonate. In green algae, major photosynthetic pigments are chlorophyll-a, chlorolphyll-b and carotenoids. Cladophora occurs in both fresh-water and marine habitat.

238. Which of the following characters are related to Spirogyra oogensis?
1. Dioecious conjugation
2. Attached species
3. Morphological anisogamy
The correct combination is:
(a) 1, 2 and 3 are correct
(b) only 1 and 2 are correct
(c) only 1 and 3 are correct
(d) only 2 and 3 are correct
AP EAMCET-2004

Ans. (d) : Spirogyra oogensis is a chlorophycian algae. It is an attached species and during reproduction produces anisogametes i.e., morphologically different male and female gametes.
Asexual reproduction is by flagellated zoospores produced in zoosporangia. The sexual reproduction shows considerable variation in the type and formation of sex cells and it may be Isogamous, Anisogamous or Oogamous.

239. Source of kelp is
(a) green algae (b) blue-green algae
(c) brown algae (d) red algae
Haryana PMT-2007

Ans. (c) : Brown algae show great variation in size and form. They range from simple branched, filamentous form (Ectocarpus) to profusely branched forms as represented by kelps, which may reach a height of 100 meters. Kelp is obtained from brown algae.

240. A term helotism is used for the symbiosis of
(a) algae and fungi (b) algae and cycas
(c) algae and bacteria (d) pinus and fungi
AMU-2006

Ans. (a) : Helotism refers to the symbiotic association of algae and fungi which is commonly called lichen symbiosis. Lichens are complex organisms that comprises of association between algae and the fungi.

241. Heterotrichous habit is shown by :
(a) Ulothrix (b) Oedogonium
(c) Chalmydomonas (d) Stigeoclonium
JIPMER-2000

Ans. (d) : In some algae, the plant body is very much evolved and consists of more than one type of filaments and thus, represents the heterotrichous habit. It is one of the characteristic feature of Chaetopharales of Chlorophyceae. For example; Stigeoclonium.

242. Agar-Agar is obtained from
(a) Gigartina (b) Gelidium
(c) Gracilaria (d) All of these
Manipal-2013
AFMC-2004
AMU-2002

Ans. (d) : Agar-Agar is obtained from the cell wall of red algae, mainly of the genus Gracilaria, Gelidium and Gigartina, etc. All of these algae are commonly characterized by belonging to the group of red algae because the predominance of the red pigment ***r-phycoerythrin*** in their body. These algae are small, have a reddish stem and are rich in mucilage, a type of fiber. These are extracted pouring hot water on them once they are dried in the sun.

243. The diploid phase in the life cycle of Spirogyra is represented by:
(a) female gamete (b) zygospore
(c) aplanospore (d) akinete
AP EAMCET-2001

Ans. (b) : In spirogyra, sexual reproduction has a cycle that alternates between a haploid gametophyte phase and a diploid zygospore phase. This zygospore grows and leads to a gametophyte. This sort of life cycle is known as, the haplontic life cycle. Spirogyra belongs to the class Chlorophyceae.

244. Characteristics of Cyanophyceae is
(a) phycocyanin (b) chlorophyll- b
(c) phycoerythrin (d) chlorophyll - a
CG PMT-2006

Ans. (a) : Cyanobacteria are photosynthetic bacteria, they are also known as Blue- Green algae. They posses phycocyanin pigment. It is blue photosynthetic pigment. It is a phycobiliprotein complex produced by cyanobacteria.

245. Synzoospore is found in
(a) Ulothrix (b) Volvox
(c) Vaucheria (d) Oedogonium
BHU PMT (Screening)-2011

Ans. (c) : Vaucheria grows in shallow freshwater or marine environments. In vaucheria, the multiflagellate compound zoospores, also known as synzoopores or conidiospores which are developed in these genus, usually in aquatic forms. A single compound zoospores develops in a single zoosporangium. Any distal branch of the thallus may convert into a zoosparangium. It is multi-flagellate. The zoospore swims for about 15 to 20 minutes. In Vaucheria, food is stored as oil globules.

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246. Two adjacent filaments of Spirogyra affinis having 10 cells participating in reproduction. How many new Spirogyra plants are produced during sexual reproduction?
(a) 5 (b) 10
(c) 20 (d) 40
Manipal-2009

Ans. (b) : Spirogyra reproduces sexually through conjugation, in which a new individual is formed when the two parts of the adjacent filaments are combined. In it 10 cells participate in the sexual reproduction of Spirogyra, then 10 new individuals are formed from the filaments.
A conjugation tube is formed between the cells of adjacent filaments. The protoplast of one cell (male gamete) migrates to the other (female gamete), these protoplast fuse to form zygospores. These zygospores undergo meiosis and, on germination, give rise to new filaments.

247. External fertilization occurs in majority of
(a) fungi (b) algae
(c) liverworts (d) mosses
DUMET-2009

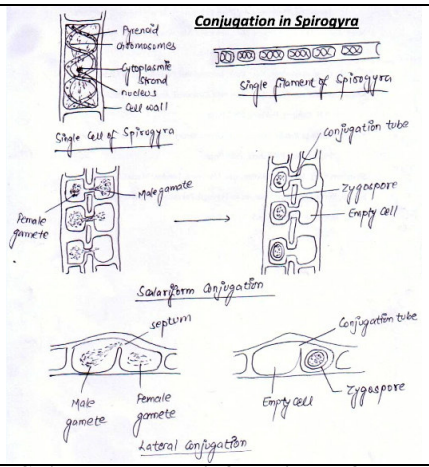
Ans. (b) : External fertilization is a type of sexual reproduction. It is a process in which the fusion of male and female gametes takes place outside the female body in an external medium, generally water.
External fertilization occurs in the majority of algae. The sexual reproduction in algae is of these types: Isogamy, anisogamy and oogamy. Here the gametes are formed, and the fertilization of gametes takes place outside the algal body. An advantage of it is that it leads to the formation of a large number of offspring. One disadvantage is that environmental hazards like predators greatly reduce the prospect of surviving into adulthood.

248. In which of the following, all listed genera belong to the same class of algae?
(a) Chara, Fucus, Polysiphonia
(b) Volvox, Spirogyra, Chlamydomonas
(c) Porphyra, Ectocarpus, Ulothrix
(d) Sargassum, Laminaria, Gracillaria
BVP-2013
DUMET-2009

Ans. (b) : Algae is the most primitive group of kingdom plantae. Alage further divided in to mainly three classes. Chlorophyceae (green algae), Rhodophyceae (red algae), and phaeophyceae (brown algae). Volvox, Spirogyra, Chlamydomonas belongs to same class chlorophyceae. Laminaria, Saragassum, Ectocarpus are members of brown algae. Polysiphonia, Porphyra, Gracilaria are members of red algae. Ulothrix is also a green algae.

249. Conjugation occurs in :
(a) Funaria (b) Oryza
(c) Spirogyra (d) Selaginella
DUMET-2001

Ans. (c) : Spirogyra is a common free-floating green, unbranched, filamentous, freshwater algae. Sexual reproduction only takes place under adverse conditions. Sexual reproduction in spirogyra takes place by conjugation. It is an Isogamous type. Fusion of non flagellate gametes resulted in zygospore. Two method of conjugation have been found: Lateral conjugation and Scalariform conjugation.



250. In Spirogyra a brief period of tetranucleate condition is found in:
(a) hold fast (b) gametangium
(c) vegetative cell (d) germinating zygote
AP EAMCET-2002

Ans. (d) : Spirogyra is an example of the Chlorophyceae. It is an unbranched, filamentous alga that is commonly found in freshwater. In Spirogyra, the asexual reproduction takes place through flagellated zoospores, the vegetative reproduction takes place through fragmentation, and the sexual reproduction takes place through conjugation. It takes place through the fusion of two non-ciliated gametes. The fusion of both kinds of gametes results in the formation of zygospores. The germinating diploid zygospores undergo meiosis to maintain the haploid. Condition, thus, in this condition, a tetranucleate condition is found for a brief period.

251. A water fern which is used as a green manure in rice fields is
(a) Salvinia (b) Mucor
(c) Aspergillus (d) Azolla
Haryana PMT-2010

Ans. (d) : Azolla belongs to the family of Salviniaceae. It is an aquatic fern that remains in Symbiotic association with the Anabena and helps in fixation of nitrogen. Azolla is used as green manure for rice crops, due to its high growth rate, nitrogen-fixing capacity, and ability to scavenge nutrients from soil and water.

252. Which of the following algae is used as a source of proteins ?
(a) porphyra tenera (b) chlorella
(c) spirulina (d) chara
CMC Ludhiana-2014

Ans. (c) : Spirulina is a non-toxic, blue-green algae that is a rich source of protein. It is named as the world's first super food because of its multiple benefits. It contains 70% full protein by biomass. It is used as protein supplement. It is also a source of vitamin B12.

253. The narrow middle part of chromatophore in Euglena is:
(a) pyrenoid (b) pyrenophore
(c) endosome (d) paramylum
AP EAMCET-2000

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Ans. (b) : The chromatophores contain the green pigments chlorophyll-a and chlorophyll-b, along with β-carotene, and are also known as chloroplast. Each chromatophore consists of a thin central pyrenophore that is enclosed by pyernoid.

254. The red colour of red sea is due to which of the following blue-green algae?
(a) Chlamydomonas nivalis
(b) Anabaena
(c) Microcystis
(d) Trichodesmium

Rajasthan PMT-2006

Ans. (d) : The red sea is named for the Trichodesmium erythraeum algae, an occasional bloom of cyanobacteria that accumutates and muddies the normally translucent blue-green waters. On the surface of these lakes, these cyanobacteria appear as red and pinkish mats. Trichodesmium will die after flowering, and the sea will turn reddish-brown. During a "bloom" of cyanobacteria, the appearance of body of water changes dramatically. Trichodesmium erythraeum is also known as "sea sawdust".

255. Sexual reproduction in Spirogyra is an advanced feature because it shows
(a) morphologically differentiated sex organs
(b) physiologically differentiated sex organs
(c) different sizes of motile sex organs
(d) same size of motile sex organs

JCECE-2015

Ans. (b) : Spirogyra is a freshwater green alga which belongs to Class Chlorophyceae. The sexual reproduction in Spirogyra is called conjugation. It involves the fusion of two morphologically identical but physiologically dissimilar, non-ciliated gametes.
The Male cytoplasm migrates through the conjugation canal, fuses with the female. This union produces a zygospore.

256. Smallest plant which contain green pigment such as higher green plant is
(a) Schizomycetes (b) Chlorophyceae
(c) Rhodophyceae (d) Phaeophyceae

VMMC-2007

Ans. (b) : Chlorophyceae is an important class of green algae. They may be unicellullar, colonial, or filamentous. The main features of the class are the use of starch as the principal food reserve and the green chloroplasts with chlorophylls a and b, in different species the chloroplast may be discoid, reticulate, cup shaped, spiral or ribbon-shaped.

257. Which of the following is not visible through electron microscope in chlamydomonas ?
(a) Contractile vacuole
(b) Stigma
(c) Neuromotor apparatus
(d) All of the above

Rajasthan PMT-2000

Ans. (c) : Neuromotor apparatus in Chlamydomonas is not visible through electron microscope.
The neuromotor apparatus is a system of non contractile cytoplasmic fibrils that is often associated with a motorium in various protozoans and may be analogous to the nervous system of higher forms.

258. Red algae are able to grow deep in sea as
(a) they can trap blue light of short wavelength in deep layer of water
(b) they have phycoerythrin to trap blue green light in deep layer of water
(c) both (a) and (b)
(d) none of these

CMC Ludhiana-2007

Ans. (c) : Red algae are also known as Rhodophyceae.
In red algae, the red color is a result of ample formation of pigment phycoerythrin, other pigments are chlorophyll A and Phycocyanin. This can absorb blue-green wavelength of light. As it is short, such wavelengths can reach maximum depth in water because Phycoerythrin traps this wavelength of light, and thus the plant is able to perform photosynthesis, through which red algae can reach maximum depth in the sea where no other type of photosynthetic entity grows.

259. Ulothrix releases zoospore during
(a) Evening (b) Morning
(c) Night (d) Noon

BCECE-2008
UP CPMT-2006

Ans. (b) : Zoospore development is the typical strategy for multiplication when the states of life are favorable, every cell of ulothrix fiber with the exception of holdfast are equipped for propagation. Through a pore in the lateral wall the mature zoospores are released into a delicate vesicle.

260. Pigment common to all algae is
(a) Alginate (b) Carotenoids
(c) Phycocyanin (d) Chlorophyll

BCECE-2009

Ans. (d) : Chlorophyll a is a common pigment in all oxygenic photosynthetic algae. In all algae, chlorophyll acts as a reaction center which absorbs light energy and converts it into chemical energy, which makes photosynthesis possible.

261. Calcium encrustation and larvicidal properties are present in
(a) Chara (b) Oscillatoria
(c) Diatoms (d) Caulerapa

AMU-2003

Ans. (a) : Chara is commonly known as stone wort. Chara is a member of class Charophyceae which includes green Algae. Charales have larvicidal properties and hence, are used to control mosquitoes. Chara is found mostly in hard, fresh water rich in organic matter and calcium. Chara plants are often encrusted with calcium carbonate and are hence commonly called stone wort.

262. In Spirogyra
(a) filaments, in which lateral conjugation occur are homothallic
(b) filaments, in which sclariform conjugation occur are homothallic
(c) filaments, in which lateral conjugation occur are heterothallic
(d) a sexual reproduction occur by zoospores

AMU-2003

Ans. (a) : Spirogyra can reproduce both sexually and asexually. Asexual reproduction takes place through fragmentation of the filaments. Sexual reproduction occurs by lateral conjugation. Here, the two adjacent cells of same filament fuse together to form a zygospore.

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C. Bryophytes

263. The amphibians of plant kingdom are
(a) multicellular non motile algae
(b) bryophytes with simple internal organisation
(c) unicellular motile algae
(d) pteridophytes with complex internal organisation

TS EAMCET-10.08.2021 Shift-I / HP CET-2013
BCECE-2009 /JIPMER-2004
VMMC-2003, 2002 /DUMET-2001
Haryana PMT - 2000 /AIPMT - 1996

Ans. (b) : Bryophytes are called amphibians of the plant kingdom because these plants though live in soil but they require water for sexual reproduction. The sperms of bryophyte are flagellate and need water to swim to the eggs. Bryophytes is to be non-vascular plants. Asexual reproduction is the main method of reproduction in bryophytes.

264. In Funaria capsule, dispersal of spores takes place through
(a) Peristomial teeth (b) Annulus
(c) Calyptra (d) Operculum

CMC Ludhiana-2011 /AP EAMCET-2011
VMMC-2011 /BHU PMT (Screening)-2009
Uttarakhand PMT-2009 / MP CPMT-2009
AMU-2005 / Manipal-2004 /UP CPMT-1995

Ans. (a) : Dispersal of spore take place due to hygroscopic nature of peristomial teeth. One or two rings of tooth-like appendages surround the capsule opening of masses known as peristomes. The teeth unfold under dry conditions to disperse spores gradually. Haplolepiodus consist of one ring of 16 peristomes. It arranged in 16+16.

265. Protonema occurs in the life cycle of
(a) Riccia (b) Funaria
(c) Anthoceros (d) Spirogya

JIPMER-2012 /BVP-2012 / Manipal-2012
VMMC-2011/ Uttarakhand PMT-2009
BHU PMT (Screening)-2009 / CG PMT-2006
AIPMT-1993, 1990

Ans. (b) : The earliest stage of a bryophytes (funaria) life cycle is called a protonema, and it is a cell chain that look like a thread. They reproduce by spore formation. They have no vascular system. At the point when a mass initially develops from the spore, it becomes as a protonema which forms into a verdant gametophore.

266. Which of the following is known as bog moss?
(a) Polytrichum (b) Funaria
(c) Sphagnum (d) Porella

AIPMT-2014 / Manipal - 2012 /AFMC - 2010
UP CPMT-2010/ CG PMT-2009/ Haryana PMT-2009

Ans. (c) : Bog moss is an aquatic moss also known as peat moss or cotton moss. Sphagnum is known as the bog moss, it is a living moss found in wet and boggy areas.
It can store water as both living and dead plants hold large quantities of water inside their cells. It also regulates moisture and air around the plant roots for making suitable conditions of root growth and development.

267. In Funaria, stomata are present on the
(a) stem (b) leaves
(c) capsule (d) archegonia

CG PMT-2010 / BCECE-2010
CMC Vellore-2009 / Punjab MET-2009
Rajasthan PMT-2009 / MGIMS Wardha-2008
Haryana PMT-2007 / UP CPMT-2001

Ans. (c) : In Funaria, stomata are absent in leaf and is present in capsule (apophysis). The stomata as present only in the apophysis, which is present at the basal part of the capsule.

268. In bryophytes
(a) both generations are independent
(b) gametophytes are dependent upon sporophytes
(c) sporophytes complete their life cycle
(d) sporophytes are dependent upon gametophytes

Punjab MET-2003 / AFMC - 2000
AIPMT-199 4/ Rajasthan PMT-1998

Ans. (d) : In bryophytes sporophytes are dependent upon gametophytes, the long–lived and conspicuous generation is the gametophyte, while in vascular plant it is sporophyte. Structures resembling stem, roots, and leaves are found on the gametophores of bryophytes in the vascular plant.

269. Bryophytes can be separated from algae, because they
(a) possess archegonia
(b) contain chloroplast
(c) are thalloid forms
(d) have no conducting tissue

VMMC-2002 / Haryana PMT-2000,2001
AIPMT-1997, 1999 /AIPMT-1997

Ans. (a) : Bryophytes can be separated from algae, because they possess archegonia. Both algae and bryophytes have motive sperm and need water for fertilization, but bryophyte can be separated from algae because archegonia originated from the first time in bryophytes in plant kingdom. It is a flask shaped structure with swollen base called venter and upper elongated neck.

270. Calyptra develops from
(a) venter wall of archegonium
(b) outgrowth of gametophyte
(c) neck wall of archegonium
(d) paraphysis of the archegonial branch

JIPMER-2012, 2009 / BHU PMT (Screening)-2009
Uttarakhand PMT-2009 / Rajasthan PMT - 1998

Ans.(a) : Calyptra develops from venter wall of archegonium. Calyptra is a covering that develops from the venter wall of archegonium in bryophytes and pteridophytes. Where this is an enlarged archegonia center that protects the capsule which in turns contains the embryonic sporophytes. It acts as a transpiration shield around the immature capsule and provides protection to the young capsule.

271. Funaria gametophyte is
(a) Dioecious (b) Heteroecious
(c) Autoecious (d) Monoecious and autoecious

MGIMS Wardha-2010 /MP PMT-2004, 2001
AIIMS-2001/ AMU-1990

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Ans. (d) : Funaria is both monoecious and autoecious, such that male and female reproductive structures develop on different branches of the same plant. Autoecious means male & female sex organs one found on the same plant but one on different branches (green photosynthetic).

272. In bryophytes, the posterior part of archegonium grows to protect the embryo. It is

(a) paraphysis (b) apophysis
(c) hypophysis (d) calyptras

BHU PMT (Mains)-2009 / Haryana PMT-2008
Rajasthan PMT-2006 / BHU PMT-2002
Rajasthan PMT-1998

Ans. (d) : Calyptra is the layer of cells that develop from the posterior part of the archegonium and covers the developing sporophyte of mosses and liverworts. Calyptra is a small, maternal gametophytic structure that covers the apex of the offspring sporophyte and is critical for the transition from seta formation to capsule differentiation in many moss taxa.

273. Match the column – I with column –II and choose the correct option from the following:

Column –I (Plant groups)	**Column –II (Examples)**
(1) Bryophyta	**p. Pinus**
(2) Gymnosperm	**q. Adiantum**
(3) Algae	**r. Sphagnum**
(4) Pteridophyta	**s. Ectocarpus**

	1	**2**	**3**	**4**
(a)	q	s	p	r
(b)	s	r	q	p
(c)	r	p	s	q
(d)	q	p	s	r

Karnataka CET-20.05.2023

Ans. (c) :

1.	Bryophyta	r.	Sphagnum
2.	Gymnosperm	p.	Pinus
3.	Algae	s.	Ectocarpus
4,	Pteridophyta	q.	Adiantum

274. Selaginella belongs to the following class

(a) Pteropsida (b) Sphenopsida
(c) Psilopsida (d) Lycopsida

TS EAMCET-10.05.2023, Shift-II

Ans. (d) : Lycopodium and selaginella belongs to class Lycopsida(Pteridophyte).
Pteridophytes are also known as vascular cryptogams or snaks of plant kingdom. plant body is sporophyte and differentiated into root, stem and leaves.
Pteridophytes are divided in 4 classes psilopsida, Lycopsida, tpropsida, sphenopsida.

275. Choose the incorrect pair

(A) Photosynthesis - Arnon
(B) Study of Bryophytes - Stephen Hales
(C) Study of cell structure and function - Camararius
(D) Study of plant anatomical tissues - Nehemaiah Grew

(a) A, B (b) A, C
(c) B, C (d) C, D

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Study of Bryophytes- Stephen Hales
Study of all structure - Camararious

- Study of Bryophyle is called Bryology.
- Bryophyta term given by Robert Braun
- Photosynthesis discovered by Jan Baptista Van Helmont. It is a Physilogist and physian.
- Study of plant Ahatonical tissue on Gottleib Haberlahdt.

276. Capsule producing spores and Pseudo-elaters are found in

(a) Funaria (b) Marchantia
(c) Anthoceros (d) Sphagnum

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : Capsule producing spores and pseudoelators are found in hornworts e.g. Anthoceros.
Pseudoelators are helpful in spore dispersion. Anthoceros occurs in moist, shaded habitats in subtropical and warm temperate regions. On the ventral surface of Anthoceros many smooth walled rhizoids are present which help is fixation.

277. Select the correct statements

A. In liverworts, mosses and ferns gametophytes are free living
B. Sporophyte in mosses are more elaborate than in liverworts
C. In Gymnosperms and Angiosperms gametophytes are independent
D. Pinus and Cycas are dioecious

(a) A and C are correct
(b) A and B are correct
(c) A, B and C are correct
(d) A, B, C and D are correct

TS EAMCET-11.05.2023, Shift-I

Ans. (b) : In mosses, liverwort, and ferns gametophyte are free living. and sporophyte of mosses are more developed than liverworts. Mosses gametophytes leafy and sporophyte have capsule on the end of stalk (setae). gametophyte of liverwort have leaves without midrib (costa) and leaves inserted at angle to stem. sporophyte has a transluscent stalk, capsule black and egg shaped.

278. Intercalary meristamatic zone, paraphyses, Elaeters are the characters of these Bryophytes respectively.

(a) Hepaticopsida, Anthocerotopsida, Bryopsida
(b) Anthocerotopsida, Hepaticopsida, Bryopsida
(c) Bryopsida, Hepaticopsida, Anthocerotopsida
(d) Anthocerotopsida, Bryopsida, Hepaticopsida

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : Intercalary meristamatic zone, paraphyses, Elaeters are the characters of Bryophytes respectively- Anthocerotopsida, Bryopsida, Hepaticopsida.
Pseudoelators present in Anthocerotopsida (Anthoceros). Elaters and pseucdoelators are helpful in spores dispersion.

279. Which of the following statements is true?

(a) Most algal genera are diplontic
(b) Most bryophytes do not have haplo-diplontic life cycle
(c) All pteridophytes exhibit haplo-diplontic pattern
(d) Seed bearing plants follow haplontic pattern

RE-NEET (UG)-06.06.2023 (Manipur)

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Ans. (c) : The haplo-diplontic life cycle seen in all bryophytes and pteridophytes along with certain algae.

• Haplo-diplontic type of life cycle involves clear alternation of generation between haploid gamete produced by gametophyte and a diploid spore produced by sporophyte.

• Seed bearing plants are gymnosperms and angiosperms and both of them follow diplontic life cycle.

280. Assertion A : The first stage of gametophyte in the life cycle of moss is protonema stage.
Reason R : Protonema develops directly from spores produced in capsule.
In the light of the above statements, choose the most appropriate answer from the options given below
(a) A is not correct but R is correct.
(b) Both A and R are correct and R is the correct explanation of A.
(c) Both A and R are correct but R is NOT the correct explanation of A.
(d) A is correct but R is not correct.

NEET (UG) 07.05.2023

Ans. (b) : The plant body of mosses is very simple. It has a small branched stem with spirally arranged simple leaves, multicellular hairy out growths, called rhizoids.

• Protonema is a stage that is creepy, green, branching and frequently filamentous.

• Protonema is a haploid autonomous, gametophytic stage when a moss, first grow from the spore. It grow as a protonema which develop into leafy gametophyte.

281. The Juvenile stage in Mosses is called as
(a) Gametophore (b) Protonema
(c) Gemma (d) Paraphysis

AP EAMCET-12.07.2022 Shift-II

Ans. (b) : In case of Mosses the spores attain a green filamentous and branched structure called protonema that represents a juvenile stage of moss gametes. The moss lifecycle is completed in two distinct stages -the gametophyte and the sporophyte. The term that describes this type of life history is called alternation of heteromorphic generations.

282. Which one of the following is an example of aquatic floating bryophytes ?
(a) Ricca atlantica (b) Pteris vittata
(c) Riccia fluitans (d) Marchantia polymorpha

Tripura JEE-2021

Ans. (c) : Riccia fluitans is an aquatic floating plant of the liverwort. It normaly grows quickly at the surface. It can be found floating in ponds and under the water surface. Riccia fluitans is also known as floating crystalwort.

283. Gemmae are present in
(a) Some Liverworts (b) Mosses
(c) Pteridophytes (d) Some Gymnosperms

NEET-2021

Ans. (a) : Gemmae are green, multicellular asexual buds.

- The are produced by some liverworts like marchantia.
- Mosses reproduce vegetatively by fragmentation and budding of protonema.
- Pteridophytes and Gymnosperms normally do not reproduce asexually.

284. Which one of the following bryophytes is used as a fuel ?
(a) Funaria (b) Marchantia
(c) Sphagnum (d) Anthoceros

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : Sphagnum in the form of peat is used as fuel and also used for trans-shipment of living material, as it has the water holding capacity. They are used to pack bulbs, cuttings and seedlings for shipment. Dried peat may be used as fuel.

285. Plants like <u>Marchantia</u> and <u>Funaria</u> produce gametes by mitosis, because
(a) Plant body is haploid
(b) Gametophyte is diploid
(c) They are gametophytes
(d) They are dioecious

Karnataka CET-2019

Ans. (a) : In Marchantia and Funaria plant body is haploid and posses tiny leaf like appendages. The leafy stage bears sex organs. They have vegetative reproduction takes place by fragmentation and budding in secondary protonema.

286. Which one of the following organisms is a bryophyte?
(a) Liverwort (b) Volvox
(c) Chlamydomonas (d) Fern

KVPY SA-2019

Ans. (a) : Bryophytes is the informal group name for liverworts, mosses, and hornworts. They are non-vascular plants, which means they have no roots or vascular tissue, but instead absorb water and nutrients from the air through surface.

287. Statement (S) : All bryophytes are homosporous
Reason (R) : In bryophytes, gametophytic and sporophytic bodies are conspicuously different and the life cycle is called haplo-diplontic.
Which of the following is true?
(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : All broyphytes are homosporous because the antheridium and the archegonia are present on the same plants.

Bryophytes exhibit haplo-diplontic life cycle as the gametophytic phase is prominant (60%) in their life cycle.

• The sporophytes is diploid, dependent on the gametohyte for nutrition and produces spores by mitosis.

288. Which of the following propagates through leaftip :-
(a) Sprout-leaf plant (b) Marchantia
(c) Moss (d) Walking fern

AIPMT-2004

Ans. (d) : Adiantum is commonly known as walking fern, and it is due to the fact that new plants grow wherever the arching leaves of the parents touch the ground, creating a walking effect, which is an outgrowth of vegetative reproduction process. Adventitious buds develop at the leaf

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tips. When such leaf tips touch the soil, they form new plants. This continuous growth of the plants by propagating at the leaf tip appears as walking. Hence, They are known as walking ferns.

289. Female reproductive organ of Riccia is known as:
(a) Oedogonium (b) Archegonium
(c) Carpogonium (d) Oosphere

Rajasthan PMT-1996

Ans. (b) : In Bryophytes (like Riccia, Funaria etc.) dominant generation is gametophyte which is free-living, haploid and photosynthetic. In gametophytes, sex organs antheridium and archegonium are present from which antherozoid and egg are produced respectively. In Riccia, the antheridia and archegonia are scattererd and found embedded in the dorsal side of thallus.

290. Life cycle of Funaria is not completed without water. Choose the correct statement.
(a) As Funaria is a bryophyte plant
(b) As branches will not develop
(c) As fertilization takes place in presence of water only
(d) As plant is delicate and will become dry and die without water

Manipal-2013

Ans. (c) : The life cycle of Funaria is not completed without water because fertilization takes place in the presence of water only. Bryophytes are terrestrial, nonvascular plants (absence of xylem and phloem) that still require a moist environment to complete their life cycle.

291. The sporophyte of Funaria begins development within
(a) antheridia (b) capsule
(c) protonema (d) archegonium

UP CPMT-2010

Ans. (d) : Funaria's sporophyte starts to evolve within the archegonium. A mature archegonium is a flask-shaped structure borne on a short stalk. It has a swollen Venter portion and an elongated neck. A two-layered jacket covers the venter, while the jacket around neck is linked singly.
Hence, in the archegonium sporophyte is formed.

292. Vegetative reproduction in Funaria takes place by
(a) primary protonema (b) gemmae
(c) secondary protonema (d) All of the above

UP CPMT-2011

Ans. (d) : Vegetative reproduction is a type of asexual reproduction. Vegetative propagation in mosses is by fragmentation, gemmae formation, and budding in secondary protonema. Funaria is a example of mosses.

293. Funaria's male gametes are
(a) Poly flagellate (b) Mono flagellate
(c) Biflagellate (d) Tetra flagellate

AIPMT-1999

Ans. (c) : Funaria male gametes are biflagellate in which androcyte mother cells are formed from division and re-division of the primary and androgonial cell. Each androcyte mother cell divides to form two androcytes.
- The Androcytes transform into biflagellate antherozoids or sperms.

294. Apophysis in the capsule of Funaria is
(a) lower part (b) upper part
(c) middle part (d) fertile part

AIPMT-1990

Ans. (a) : Apophysis is the lower, solid, sterile portion of the capsule that contains a chloroplast and is sterile. The focal piece of the apophysis is comprised of extended flimsy walled cells forming a conducting strand.

295. Assertion (A) : The life cycle in Funaria is called diplohaplontic.
Reason (R) : In Funaria, there is alternation of haploid gametophytic and diploid sporophytic phases, one becoming parent to the other.
The correct answer is
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true.

AP EAMCET-2008

Ans. (a) : In the life cycle of Funaria there occurs two distinct individuals. One of these is haploid independent leafy moss plant. The other is diploid leafless sporogonium. It is partially dependent on the leafy gametophyte for its nutrition. Life cycle of Funaria diplohaplontic.

296. In a moss the sporophyte-
(a) is partially parasitic on the gametophyte.
(b) produces gametes that given rise to the gametophyte.
(c) Arises from a spore produced from the gametophyte.
(d) Manufactures food for itself, as well as for the gametophyte.

AIPMT-2006

Ans. (a) : Mosses, like funaria, are bryophytes. They are non-vascular plants. The main plant body is gametophytic (haploid) which is independent and foliose. It is a major part of the life cycle. The saprophytic phase starts with the zygote, which divides to form sporogenous tissue that is differentiated into foot, seta and capsule. The saprophytic phase is short lived. The foot absorbs nutrients and provides support to the sporophyte.

297. Which one has the largest gametophyte?
(a) Cycas (b) Angiosperm
(c) Selaginella (d) Moss

AIPMT-1991

Ans. (d) : The largest gametophyte is found in moss. It gets reduced in order as selaginella, Cycas, angiosperm. The gametophyte begins with the haploid spore and ends with the formation of haploid gametes.

298. The plant group that produces spores and embryo but lacks vascular tissues and seeds is
(a) Pteridophyta (b) Rhodophyta
(c) Bryophyta (d) Phaeophyta

Manipal - 2013
AIPMT-1992

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Ans. (c) : Bryophytes are the plants that produce spores and embryos, but they do not have a vascular tissue system. Bryophytes consist of the thalloid body attached to the substratum by hair-like structure called rhizoid.

299. Multicellular branched rhizoids and leafy gametophytes are the characteristics of
(a) some bryophytes (b) pteridophytes
(c) all bryophytes (d) gymnosperms

AIPMT-1997

Ans. (a) : All the characteristics features given in above question found in some bryophytes like mosses. The member of bryopsida family have a main plant body that has a leafy gametophores made up of an axis with spirally arranged leaves.

300. Elater mechanism for spore dispersal is exhibited by
(a) liverworts (b) Marchantia
(c) Riccia (d) Funaria

AIIMS - 2002
AIPMT-1996

Ans. (b) : Elaters are the long spindle shaped structures and they are hygroscopic in nature. They change their shape in response to the moisture present in the environment. They are present inside the capsule of Marchantia and serve in spore dispersal. The spore once released are dispersed by air currents and once they settle somewhere moist, germinate.

301. Which one of the following is a saprophytic bryophyte?
(a) Riccia fluitans (b) Buxbaumia aphylla
(c) funaria hygrometrica (d) Sphagnum

JIPMER-2008

Ans. (b) : Buxbaumia is a genus of twelve species of moss (Bryophyta). Buxbaumia aphylla is a widely distributed species in the northern hemisphere, which belong to the saprophytic genera of liverworts and mosses that grow up on organic water such as rotten wood.

302. Chlorenchyma is known to develop in the
(a) cytoplasm of Chlorella
(b) mycelium of a green mould such as Aspergillum
(c) spore capsule of a moss
(d) pollen tube of Pinus

AIIMS-2008

Ans. (c) : Chlorenchyma is known to develop in the spore capsule of a moss. Chlorenchyma or parenchyma that possess abundant chloroplast in them. Which are capable of photosynthesis. Most of chlorenchyma cells are present in the mesophyll area of leaves.

303. Which one of the following is not a characteristic feature of bryophytes?
(a) Filamentous rhizoids
(b) Dominant gametophytic generation
(c) Vascular tissues
(d) Amphibious habitat

Karnataka CET-2005

Ans. (c) : Vascular tissues is not a characteristic feature of bryophytes are:
a) Filamentours rhizoids
b) Dominant gametophytic generation
c) Amphibious habitat
d) Water is essential for fertilization
Bryophytes have simple conducting strand to transport water, mineral and other food materials.

304. Meiosis in Funaria occurs in:
(a) antherozoids (b) zygote
(c) spore mother cells (d) egg

AP EAMCET-1998

Ans. (c) : Meiosis in Funaria occurs in spore mother cells, which results four haploid spores are formed. Funaria is a bryophyte. Its main plant body is gametophyte which is formed by gametophyte of haploid spore. Spores are formed in sporophyte plant by meiosis division in spore mother cells.

305. In bryophytes and pteridophytes, transport of male gametes requires
(a) Water (b) Wind
(c) Insects (d) Birds

NEET-2016 Phase-I

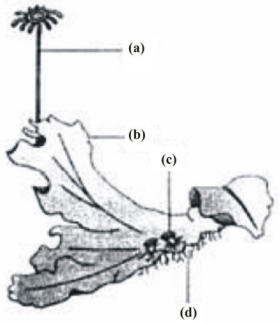
Ans. (a) : Majority of lower organisms (bryophytes and pteridophytes) require water to transport there gametes. So we can say without water they can't complete their lifecycle. The male gamete of bryophyte and pteridophyte are transferred to the female reproductive organ for fertilization.

306. Male and female gametophytes are independent and free-living in –
(a) Mustard (b) Castor
(c) Pinus (d) Sphagnum

AIPMT (Screening)-2010

Ans. (d) : Sphagnum is a moss (Bryophyte) in which gametophytes are independent and free living. Male and female gametophytes are highly reduced in gymnosperm (pinus) and angiosperm (Mustard and Castor) and dependent on sporophyte.

307. Examine the figure given below and select the right option giving all the four parts (a, b, c and d) correctly identified



	(1)	(2)	(3)	(4)
(a)	Antherid-iophore	Male thallus	Globule	Roots
(b)	Archego-niophore	Female thallus	Gemma-cup	Rhizoids
(c)	Archego-niophore	Female thallus	Bud	Foot
(d)	Seta	Sporo-phyte	Protonema	Rhizoids/

AIPMT (Mains)-2011

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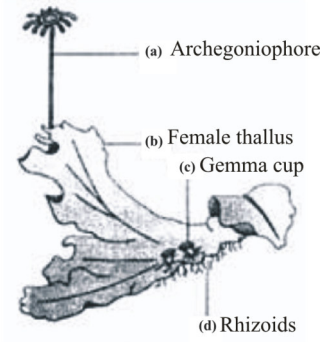
Ans. (b) : Above structure shows the thallus structure of the Marchantia of bryophytes.
(1) Archegoniophore
(2) Female thallus
(3) Gemma cup
(4) Rhizoids is the correct sequence of Marchantia in the female thallus.

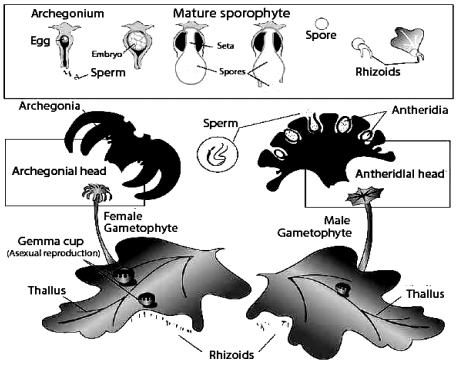


308. The plant body is thalloid in
(a) Funaria (b) Sphagnum
(c) Salvinia (d) Marchantia

NEET (Karnataka)-2013

Ans. (d) : Thalloid plant body lack real vegetative structure, in place of root, rhizoids are present.

- Marchantia belongs to class hepaticopsida of division bryophyta. It's plant body consist of a dichotomously branched thallus. They are also called liverworts. The plant body is a dorso-ventrally flattened thallus.



309. Which of the following statements is true for Bryophyta
(a) Along with water absorption roots also provide anchorment to plants
(b) Sporophyte is dominant
(c) Gametophyte is dominant and sporophyte is mostly parasitic
(d) Gametophyte is parasitic

AIPMT-1999

Ans. (c) : In life cycle of bryophyta gametophyte is dominant and sporophyte are mostly parasitic.

- The life cycle of bryophyta involves alternation of generation with a haploid gametophyte giving rise to diploid sporophyte.
- The sporophyte is not free living but attached to the photosynthetic gametophyte and derives nourishment from it.

310. Compared with the gametophytes of the bryophytes, the gametophytes of vascular plants tend to be
(a) smaller and to have smaller sex organs
(b) smaller but to have larger sex organs
(c) larger but to have smaller sex organs
(d) larger and to have larger sex organs

AIPMT (Screening)-2011

Ans. (a) : Bryophytes have a dominant gametophytes stage and produce structure called as antheridia and archegonia. In contrast, vascular plants have sporophytic plant body in most of the their life – cycle are reduced smaller gametophyte which have smaller sex organs.
Ex- Riccia, Marchantia, Porella etc.

311. Which gymnospermic order includes all fossil plants?
(a) Cycadales (b) Cycadofilicales
(c) Cycadeoidales (d) Coniferales

AP EAMCET-2011

Ans. (b): Cycadofilicales is an extinct order of gymnosperms that flourished in the carboniferous period. They possess characteristics of both the ferns and the seed plants but reproducing by means of seeds and yet retaining fern like leaves.

312. Assertion (A) : The life cycle in Funaria is called diplohaplontic.
Reason (R): In Funaria, there is alternation of haploid gametophytic and diploid sporophytic phases, one becoming parent to the other.
The correct answer is
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2008

Ans. (a) : The life cycle of Funaria has two distinct individuals. One of these is haploid, independent, leafy moss plants, the other is diploid. There is alternation of haploid gametophytic and diploid sporophytic phases, one becoming parent to the other.

313. Marchantia is considered as a heterothallic plant because it is _____.
(a) Heterogametic (b) Bisexual
(c) Monoecious (d) Dioecious

Karnataka CET-2014

Ans. (d) : When male and female flowers are originate on different plants, they are called as dioecious plants.
Marchantia is a dioecius therefore, it is considered heterothallic. This means it has two distinct male and female plant.

314. Bryophytes resemble algae in the following aspects:
(a) Differentiation of plant body into root, stem and leaves and autotrophic
(b) Thallus like plant body, presence of roots and autotrophic nutrition
(c) Thallus like plant body, lack of vascular tissues and autotrophic nutrition.

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(d) Filamentous body, presence of vascular tissues and autotrophic nutrition

Karnataka CET-2009 / Manipal - 2009

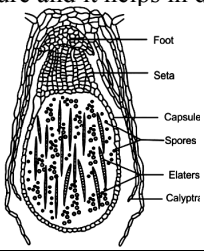
Ans. (c) : Bryophytes resemble algae in the aspects of thallus such as plant body, lack of vascular tissues and autotrophic nutrition. They are non flowering plants and do not produce flower and seeds.

315. Spore dissemination in some liverworts is aided by :

(a) Peristome teeth (b) Elaters
(c) Indusium (d) Calyptra

Rajasthan PMT-2010 / AIPMT-2007 / AIPMT-2007

Ans. (b) : Elaters are tubular cells with spiral thickenigs and often help in spore release. It is water attracting cell structure found in the capsule of liverworts. It is hygroscopic in nature and it helps in dispersal of spores.



316. Mosses are attached to substratum by

(a) roots (b) capsule
(c) rhizoids (d) main axis

HP CET - 2012
UP CPMT-2005

Ans. (c): Mosses are bryophytes with gametophytic plant body. They use rhizoids for anchoring the substratum. They are branched, slender and multicellular. They are stout, brown, almost cable like and form the main anchoring strands. The rhizoidal branches absorb water and minerals from the soil.

317. Identify the wrong statement in relation to *Funaria*

(a) Stomata are present in the epidermis of capsule
(b) Spores are viable for only one year
(c) Inner spore sac is one celled in thickness
(d) Trabeculae connect the innermost layer of the capsule wall with the outer spore sac

AP EAMCET-2013

Ans. (b): Spores of funaria hygrometrica have been reported to remain viable up to 9 years. In the present study spores were found to remain viable for 11 years. Funaria belongs to the family **Funariaceae.** It comprises of the cord mosses and being characterised by filamentous setae, a gibbous obtusely pyriform capsules and usually a double peristome of 16 teeth.

318. Which one is pioneer in gametophyte generation of bryophytes?

(a) Spore (n) (b) Protonema
(c) Sporogonium (d) Spore mother cell

UP CPMT-2014

Ans.(a): Spore is the 1st cell of the gametophytic generation. Spores are produced as a direct result of meiosis.

- These haploid pioneer structure of gametophytic generation are formed from spore mother cell by meiosis which in turn are produce within sporangium.

319. Mosses occurs in moist places because

(a) They can not grow on land
(b) Their gametes fuse in water
(c) They lack vascular tissue
(d) They lack root and stomata

VMMC-2006 / UPCPMT-2002

Ans. (b) : The reproduction in mosses takes place in water, thus they occur in moist place. As fertilization takes place only in the presence of water, through motile antherozoids that swim to reach the archegonium. They are also called as amphibians of plant kingdom due to dependence on water.

320. In ferns and mosses, movement of antherozoids towards female component is called :

(a) phtotaxis (b) chemotaxis
(c) hydrotropism (d) thigmotropism

Rajasthan PMT-1998

Ans. (b) : In fern and mosses (Bryophytes), movements of antherozoids towards female component archegonium is stimulated by a special chemical like sugar called chemotaxis movement.

321. In which of the following pairs of genera sporocarps are present ?

(a) Marsilea and Salvinia
(b) Marsilea and Isoetes
(c) Isoetes and Salvinia
(d) Marsilea and Lycopodium

Uttarakhand PMT-2006

Ans. (a) : The sporocarp develops when plant becomes mature in aquatic species water evaporate and they develop in shallow water but in terrestrial species they are developed when water completely dries. The primary function of sporocarp is the production and release of spores. The sporocarpars are present in the genera Marsilia and Salvinia.

322. Consider the following statements and select the true and false statements among the following codes given below.

I. Trimerous conditions of floral whorl is characteristic of dicotyledons.
II. Adiantum is also called as walking fern
III. In gymnosperms the vascular system consists of xylem without vessels and phloem with companion cells.
IV. Riccia and Marchantia are liverworts.

(a)

True	False
I, II	III, IV

(b)

True	False
I, III	II, IV

(c)

True	False
I,IV	II, III

(d)

True	False
II,IV	I, III

(e)

True	False
I, III	II, IV

CMC Vellore-2015

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Ans. (d) : Adiantum is also called walking fern due to new plant grow when arching leaves of the fern touch the ground. Riccia and Marchantia both belong to the kingdom plantae and both are bryophytes. They are a genus of liverworts. Trimerous conditions of floral whorl is characteristic feature of monocots while the dicot flower shows dimerous, tetramerous or pentamerous conditious. The ferns, Gymnosperms, and flowering plants are all vascular plants. Because they possess vascular tissues.

323. At the base of seta of capsule of moss, there is a haploid brownish growth called:
(a) calyptra (b) perigonium
(c) veginula (d) perichaetial

CMC Ludhiana-2007 / Manipal-2006

Ans. (c) : Veginula is the part of venter of archegonium left at the base of seta. It is haploid in nature. In mosses, the ring or sheath enveloping the base of the seta, derived from the base of the archegonium and surrounding stem tissues and remaining after separation of the calyptra.

324. In capsule of moss, shock absorbers are:
(a) trabeculae (b) peristome teeth
(c) seta (d) annulus

Manipal-2006

Ans. (a) : Trabeculae are the shock absorbers in capsule of moss. It is one of the projections from the cell wall that extends across the cavity of the ducts of certain plants, or the plate of cells across the cavity of the sporangium of a moss.

325. Which of the following in moss capsule is haploid/gametophytic tissue?
(a) Anriulus and peristome
(b) Calyptra and spore
(c) Columella and theca
(d) Operculum foot and seta

Manipal-2006

Ans. (b) : Calyptra and spore are the haploid/ gametophytic tissue in moss capsule. Calyptra is a small, maternal gametophytic structure that covers the apex of the offspring sporophyte and is critical for the transition from seta formation to capsule differentiation in many moss taxa.

326. Difference between algae and bryophyte is:
(a) terrestrial habitat (b) sterile jacket
(c) biflagellate gametes (d) none of these

Rajasthan PMT-2004

Ans. (b) : The main difference between algae and bryophytes is the division of plant body. No division of observed in algae whereas the plan body of bryophytes internally divided into photosynthetic and storage zone and in bryophytes sex organs are always multicellular and protected by a jacket of sterile vegetative cells. But in the sex organ of algae are single celled without a jacket of sterile vegetative cells.

327. The positive evidence of aquatic ancestory of bryophytes is:
(a) peristomial teeth (b) ciliated sperms
(c) chemotaxis (d) gametophytic plant body

BHU PMT-2002

Ans. (b) : Ciliated sperms are positive evidence for aquatic ancestry of bryophytes. Each sperm usually consist of minute, slender, spirally curved body or furnished with two long, terminal whiplash type flagella.

328. In Funaria, calyptra is derived from:
(a) capsule (b) columella
(c) antheridium (d) archegonium

AFMC-2002

Ans. (d) : In Funaria, calyptra is derived from archegonium. Funaria is a moss. They don't have a vascular system. Funaria fertilization is dependent on water for the transfer of sperm to the egg. The main plant body is gametophyte which is independent and the sporophyte is partially or fully dependent on gametophytic generation. It is commonly called rope moss or cord moss. The calyptra is protective envelop around the developing embryo. It is formed by the basal part of the archegonium.

329. Which of the following is not a case of epimorphosis?
(a) Formation of sperms from small clumps of cells
(b) Regeneration of tail in a lizard
(c) Replacement of severed arm in starfish
(d) Replacement of limp in salamander

Rajasthan PMT 2009 / MGIMS Wardha-2004

Ans. (a) : The regeneration of the absent or disappeared, or disoriented tissues and organs through the process of redifferentiation of existing tissues or organs are termed as epimorphosis. Here, new growth is seen as in case of healing of wound, regeneration of lost parts, etc. The formation of sperms from small clumps cannot be a case of restorative regeneration or epimorphosis.

330. In Sphagnum, the gametophyte structure compensating for the absence of seta is known as:
(a) columella (b) elatrophore
(c) sporangiophore (d) pseudopodium

VMMC-2006

Ans. (d) : Pseudopodium is the gametophytic structure compensating for the absence of seta in Sphagnum.
Seta is one of the sporophytes which represents the spore of bryophytes, but in case of sphagnum, the seta is absent and other spores are present.

331. The protective device over the developing sporophyte is shoot calyptra in:
(a) Frullania (b) Sphagnum
(c) Anthoceros (d) Pellia

VMMC-2006

Ans. (a) : The protective device over the developing sporophyte is shoot Calyptra in Frullania. Frullania is the only genus of liverworts in family Frullaniaceae. Plant is dull green, leafy. The plant is dioecious.

332. Bryophytes lack true:
(a) roots (b) stem
(c) leaves (d) all the above

Uttarakhand-2005

Ans. (d) : Bryophytes lack true roots, stem and leaves. The plant body bryophytes is more differentiated than that of algae. They may possess root- like, leaf- like or stem- like structures. They don't have roots. Instead they have thin root like growths called rhizoids that help anchor them.

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333. Sex organs in Funaria develop:
(a) is axil of leaf (b) at tip of gametophore
(c) inside capsule (d) in protonema
Uttarakhand-2005

Ans. (b) : In Funaria, sex organs develop at the tip of gametophores in cluster. In Funaria, sexual reproduction is oogamous. The male reproductive part is called the antheridium and the female reproductive part is called the archegonium.

334. Largest moss is
(a) Pogonatum (b) Funaria
(c) Dawsonia (d) Polytrichum
MGIMS Wardha-2009 / Haryana PMT-2009
CG PMT-2009

Ans. (c) : Dawsonia is largest robust terrestrial moss with stiff leaves that reaches 70 cm in length. It is found in New Zealand, Australia etc.

335. Thallus of Riccia is :
(a) tetraploid (b) triploid
(c) diploid (d) haploid
JIPMER-2001

Ans. (d) : Gametophytic plant body is dominant in bryophytes so thallus of Riccia is haploid (n) in nature. It is small, green flat and rather fleshy. They commonly grow in moist soil, particularly during and after rain.

336. Mosses are indicator of
(a) air pollution (b) water pollution
(c) radiation pollution (d) soil pollution
Manipal-2013

Ans. (a) : Mosses are bioindicator and bioaccumulators in air pollution because they have lack of roots. Air Pollutants affect the habitat and growth forms of Bryophytes.

337. The peculiar feature of Marchantia palmata is
(a) Absence of gemma cup
(b) Presence of androgynous receptacles
(c) Absence of elaters
(d) All of the above
VMMC-2005 / AMU-2004

Ans. (b) : The peculiar feature of Marchantia palmata is Presence of androgynous receptacles. In Marchantia, sex organs are borne on special stalked receptacles, the gametophores. These are specialized multicellular asexual reproductive bodies. Androgynous receptacle bears both archegonia and antheridia on same receptacle. Vegetative reproduction takes place with the help of gemma cup.

338. Embryo is found in
(a) Ulothrix (b) Spirogyra
(c) Funaria (d) Chlorella
CG PMT-2006

Ans. (c) : In Funaria, male and female reproductive organs are on the same plant but different branches. Funaria is protandrous i.e., male sex organs mature first. Water is essential for fertilization. The antherozoids reach to archegonial neck and swim down to venter. Any one antheroizoid fuses with egg to form zygote, it becomes oospore. Which divides and redivides to form embryo. Later, the embryo grows into a sporophyte.

339. Which of the following is important source of edible protein?
(a) Spirogyra (b) Porphyra
(c) Spirulina (d) Cephaleuros
MGIMS Wardha-2009

Ans. (c) : Spirulina is a genus of multicellular blue-green microalgae. Spirulina is the world's first superfood, and one of the most nutrient-rich foods on Earth.
This is highly rich in proteins, vitamin-B complex and minerals. Powdered Spirulina is being used in herbal tonics and biscuits.

340. Diatoms do not decay easily because
(a) they have siliceous walls
(b) their body is impervious to water
(c) they are chitinous
(d) they are abundant in saline soil
BHU PMT (Screening)-2011

Ans. (a) : Diatoms have unique double shells made up of opaline silica. Cell of Diatoms are surrounded by cell wall having to parts or frustules; frustules make two overlapping halves (the epitheca and the hypotheca).

341. The brown hairs present at the base of the petiole of Pteris are called:
(a) setae (b) ramenta
(c) spines (d) stipules
AP EAMCET-2002

Ans. (b) : The brown hair present at the base of the petiole of Pteris are known as ramenta. The epidermal cells gives rise to this uniseriate bicellular brown hairs on young leaves of the Pteris or on any fern. Ramenta provides Pteris with protection from external injuries.

342. A plant which is first terrestrial and then becomes epiphyte (space parasite)?
(a) Vanda (b) Cuscuta
(c) Rafflesia (d) Santalum
CG PMT-2011

Ans. (a) : Space parasite means a plant parasite which depends on other plants for space, for growth but not for nutrients and water.
Vanda plant is an epiphyte. It means those plants grow upon other plants. It depends on the host plant for shelter and nutrition without harming the host plant.

343. Who is regarded as father of Indian Bryology?
(a) KC Mehta (b) VK Kashyap
(c) SR Kashyap (d) RN Singh
BVP-2013

Ans. (c) : Shiv Ram Kashyap is known as "Father of Indian Bryology". He was a botanist in British India. He published the book 'Lahore district Flora' with family friend.

344. The sporogenous tissue is originated from amphithecium in which of the following ?
(a) Riccia (b) Marchantia
(c) Anthoceros (d) Funaria
Rajasthan PMT-2000

Ans. (c) : In Anthoceros, it extends from base to the top of the capsule. It originates from the inner layer of amphithecium. In anthoceros and sphagnum, the amphitheium give rise to the sporogenous tissue.

345. Which of the following is true about bryophytes ?
(a) They are thalloid
(b) They contain chloroplast

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(c) They possess archegonia
(d) All of the above

BHU-PMT (Screening)-2008 / BHU PMT-2004
Uttarakhand PMT-2008

Ans. (d) : The plant body is thallus-like, i.e., prostrate or erect.
They contain chloroplast like pyrenoid.
They posses archegonia i.e. female sex which is flask shaped and generates one egg.

346. Spore of Funaria on germination gives rise to
(a) Protonema (b) Sporophyte
(c) Prothallus (d) Capsule

BCECE-2008

Ans. (a) : On germination, the spores of Funaria give rise to protonema. The protonema is an elongate, thread-like structure that develops from the germinated spore of mosses and some liverworts. It is the initial stage of the organism which turns to gametophyte at maturity. Protonema is a filamentous green chain of cells that forms the juvenile gametophyte stage. The buds forks on the chloronemata of protonema and differentiate into gametophores.

347. Tissue differentiation is well developed in
(a) Bryophyrtes (b) Fungi
(c) All algae (d) Virus

UP CPMT-2013

Ans. (a) : Tissue differentiation is well developed in Bryophytes. Hence the cells derived from optical meristem and perform specific functions is caused differentiation.

348. Which type of rhizoids are present in riccia?
(a) Unicellular smooth
(b) Multicellular smooth
(c) Unicellular smooth and tuberculated
(d) Multicellular smooth and tuberculated

Rajasthan PMT-2006

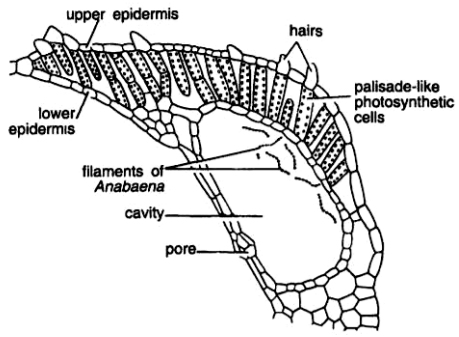
Ans. (c) : In Riccia, rhizoids are unicellular and unbranched structure. Rhizoids are a filamentous outgrowth similar to root hairs in structure. They anchor the thallus to the substratum and are usually of two types: smooth walled and tuberculated. Tuberculated rhizoids help in anchorage and absorption. Rhizoids are present in the mid-rib region of the thallus.

D. Pteridophytes

349. Aquatic fern is used to increase the yield in paddy crop:
(a) Azolla (b) Salvinia
(c) Marsilea (d) Isoetes

Tripura JEE-2022 / AMU-2007 / BCECE-2003
AIPMT-2001 / AIPMT-2000

Ans. (a) : Azolla plays a very important role in rice production. Azolla is nitrogen fixing partner, Anabaena, have been used as green manure to fertilize rice paddies and increase production. It is a biofertilizer, Biofuel, medicine, and food material. As a biofertilizer, Azolla is also used for the cultivation of paddy and many other crops for increasing their yield.



Azolla. T.s. through dorsal (floating) lobe of leaf.

350. If a sporangium is derived from a single cell, it is called
(a) Leptosporangiate (b) Eusporangiate
(c) Heterosporangiate (d) Monosporangiate

AMU-2005 / Manipal-2004
Uttarakhand PMT-2004 / AMU -2000

Ans. (a) : When sporangium is derived from a single cell it is called leptosporangiate. Such sporangia have lesser number of jacket layers and contain lesser number of spores.
Example- Azolla, Salvinia

351. Which of the following propagates through leaf-tip?
(a) Walking fern (b) Sprout-leaf plant
(c) Marchantia (d) Moss

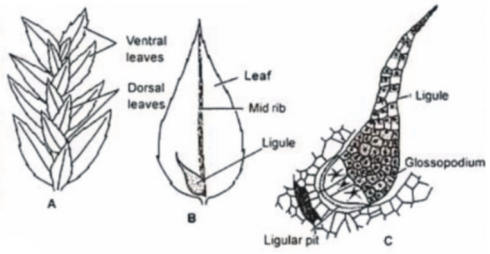
CMC Ludhiana-2009 / JCECE-2009
Manipal-2007 / AIPMT-1998

Ans. (a) : The scientific name of the walking fern is *Adiantum caudatum* are called 'walking fern' due to the fact that new plantlets grow when arching leaves of the fern touch the ground. The walking effect is due to vegetative reproduction.

352. In Selaginella, the adaxial outgrowth, from the base of leaf, is called :
(a) ligule (b) velum
(c) rhizophore (d) glossopodium

BHU PMT (Mains)-2009 / AMU-2005
Manipal-2004 / Uttarakhand PMT-2004

Ans. (a) : In Selaginella, the adaxial outgrowth, from the base of leaf, is called ligule. It is a minute structure present on the adaxial surface of the leaf. A ligule arises from the base of each leaf (ligulate) as an adaxial outgrowth. They are delicate, green with entire or serrate margin and acute apex.



SELAGINELLA
A. Branch B. Leaf with Ligule, C. L.S of Ligule.

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353. Genera like Selaginella and salvinia produce two kinds of spores. Such plants are known as:

(a) Heterosporous (b) Homosorus
(c) Heterosorus (d) Homosporous

NEET-2021 / BHU PMT (Screening)-2010
AIPMT-2008 / BHU PMT-2002

Ans. (a) : A plant that produces two types of spores that vary in size and shape is called heterosporous spores. Plants like Selaginella and Salvinia produce two kinds of spore (Mircospores and Macrospores). Most of the pteridophytes produce single type of spores is called **homosporous.**

354. Plant that possess characters like ramenta, archaegonia, circinate

(a) Pinus (b) Dryopteris
(c) Cycas (d) Funaria

AP EAPCET-22.05.2023, Shift-I

Ans. (b) :Dryopteris:- It is commonly known as male shield fern.
Rhizome represents the modified underground stem. The entire surface of rhizome is covered with persistent leaf base and numerous, thin brown membranous scales called **ramenta**.
Leaves develops the apex of the rhizome in acropetal order. young leaves are circinately coiled (circinate vernation)
Archegonia is a female reproductive part of Dryopteris.

355. Match List-I with List - II.

	List-I		List-II
(A)	**Pteropsida**	**(i)**	**Psilotum**
(B)	**Lycopsida**	**(ii)**	**Equisetum**
(C)	**Psilopsida**	**(iii)**	**Adiantum**
(D)	**Sphenopsida**	**(iv)**	**Selaginella**

Choose the correct answer from the options given below:

(a) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(b) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(c) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(d) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Psilopsida (Subdivision) includes living as well as fossil plants, roots are absent, Aerial portion is sparingly or profusely branched. The branching is usually dichotomous type. Ex- Rhynia, Psilotum

- Lycopsida includes both fossil and living pteridophytes. The plant body is sporophytic and can be differentiated into root, stem and leaves, Ex–Lycopodium, Selaginella
- Sphenopsida, stem in majority of the forms is long jointed or articulated and is ribbed i.e. having ridges and grooves. Ex – Equisetum.
- Pteropsida sub-division includes the plants which are commonly known as 'ferns' Ex- Adiantum.

356. Identify the pair of heterosporous pteridophytes among the following :

(a) Equisetum and Salvinia
(b) Lycopodium and Selaginella
(c) Selaginella and salvinia
(d) psilotum and salvinia

NEET (UG) 07.05.2023

Ans. (c) : Some pteridophytes are produce two different types of spores such pteridophytes are known as heterosporous and the phenomenon is known as Heterospory.
Ex. Selaginella, Salvinia, marsilea, isoets etc.

- The development of the female gametophyte starts while the megraspore is still inside the mega sporangium.
- Some is true of microspores i.e they also start germinating into male gametophyte white they are still inside microsporangium.
- Female gametophyte derives its nourishment from the sporophyte i.e. female gametophyte is depend on sporophyte for its nourishment.
- The dependence of female gametophyte on sporophyte for its nourishment provides better starting point for the development of new embryo than an independent green prothallus which was to manufacture its own food.

357. Choose the incorrect statement among the following:

(A) Pteridology is the study of vascular cryptogams.
(B) Reciprocal relation between plants and environment is called palynology.
(C) Biophysics and molecular biology are pertinent to both plant and animal science.
(D) It is possible to produce disease free plants in large number with tissue and organ culture.

Options:

(a) A, B only (b) B, D only
(c) A, C only (d) B, C only

TS EAMCET-30.07.2022 Shift-II

Ans. (a) : (A) Pteridology is the study of pteridophytes. Pteridophytes have well developed tissue system and so these are higher cryptogams or vascular cryptogams.
(B) Palynology is the study of pollen grains.
(C) Biophysics and molecular biology are pertinent to both plant and animal science.
(D) Tissue culture is the technique of growing cells and tissue in an artificial medium separated from the organism. This technique is also called as micropropagation. It produce disease free plants in large number by meristem tip culture.

358. Following is not a common feature in both ferns and Gymnosperms

(a) Presence of Archegonia
(b) Circinate vernation
(c) Presence of ramenta
(d) Presence of ovules

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : Presence of ovules is not a common feature in both ferns and gymnosperms. Ferns are plants that do not bear flowers and do not have any seeds as well.
While gymnosperms have seeds, although seeds are not put inside an ovary.

359. Salient features like Embriophytic Tracheophytic, Cryptogams refers to ————

(a) Angiosperms (b) Gymnosperms
(c) Pteridophytes (d) Bryophytes

AP EAMCET-03.09.2021 Shift-I / UP CPMT-2012

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Ans. (c) : Cryptogams are refers to those vascular plants that disperse spores i.e. Pteridophytes. Thus cryptogam refers to the production of a separate, small, archaegoniate gametophytes. The pteridophytes are the first terrestrial plants to possess vascular tissues.

360. Assertion (A) : In evolution the distribution of Bryophytes and Pteridophytes, was limited
Reason (R): The need of water for the transportation of male gametes and fertilization limited their distribution
The correct option among the following is
(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-10.08.2021 Shift-I

Ans. (a) : Bryophytes and Pteridophytes are limited in distribution and restricted to narrow geographical regions because they need water for the transportation of male gametes and fertilization. They grow in cool, damp and shady places.

361. Which statements regarding heterospory are correct?
(i) The megaspores and microspores germinate and give rise to female and male gametophytes respectively.
(ii) The female gametophytes in these plants are retained on the parent sporophytes for variable periods.
(iii) The development of the zygotes into young embryos takes place within the female gametophytes.
(iv) This event is a precursor to the seed habit considered as an important step in the evolution.
Options:
(a) (i), (ii) & (iii) only
(b) (ii) & (iv) only
(c) (i), (ii), (iii) & (iv)
(d) (i), (iii) & (iv) only

AP EAMCET-03.09.2021 Shift-II

Ans. (c) : Heteropspory is the production of spores of two different sizes and sexes by the sporophytes of land plants. The megaspores and microspores germinate and give rise to female and male gametophytes respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods. The development of the zygotes into young embryos take place within the female gametophytes. This event is a precursor to seed habit and an important step in evolution.

362. Arrange the following plants with their respective classes in the same order.
Sphenopsida, Psilopsida, Pteropsida, Lycopsida, Gnetopsida
(A) Selaginella (B) Equisitum
(C) Sphagnum (D) Adiantum
(E) Psilotum (F) Gnetum
Options:
(a) B, C, D, A, E (b) B, E, D, A, F
(c) A, C, B, F, D (d) F, D, B, C, A

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Equisitum :- Belongs to the order Sphenopsida.
Psilotum :- Belongs to the order Psilopsida.
Adiantum: - Belongs to the order Pteropsida.
Selaginella :- Belongs to the order Lycopsida.
Gnetum : - Belongs to the order Gnetopsida.

363. From evolutionary point of view, retention of the female gametophyte with developing young embryo on the parent sporophyte for some time, is first observed in
(a) Mosses (b) Pteridophytes
(c) Gymnosperms (d) Liverworts

NEET-2019

Ans. (b) : Pteridophytes are considered as the first plants to be evolved on land. They are cryptogams, seedless and contain vascular tissue but lack xylem vessels and phloem companion cells.
- In pteridophytes, megaspore is retained for a significant amount of time within female gametophyte on the parent sporophyte, however the permanent retention of seed is seen in Gymnosperm. Thus, pteridophytes exhibit precursor to seed habit.

364. Assertion : Psilotum is living fossil.
Reason: Equisetum in heterosporous ptridophyte.
The correct answer is
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true.

AIIMS-26.05.2018 Shift-I

Ans. (c) : The whisk fern of the Psilotum species is a living fossil (primitive pteridophyte). Equisetum is a homosporous pteridophyte.
Hence, A is true but R is false.

365. Pteriodophytes, especially ferns possess the following characteristics
(i) Circinate vernation (ii) Ramenta
(iii) Eustele (iv) Paraphyses
Options:
(a) iii & iv (b) i & ii
(c) i, ii & iv (d) ii, iii & iv

TS EAMCET-02.05.2018 Shift-I

Ans. (b) : Circinate arrangement of young leaves & the presence of ramenta are charcteristic feature of ferns.
- Eustele is a type of stele found in mostly seeded plant. It is a type of siphonostele in which the vascular bundles are arranged in a ring pith surrounded primary vascular tissue.
- Paraphysis is a sterile hair like filament present among the reproductive organs in many lower plants, especially Broyphytes, Algae & Fungi.

366. Which one of the following pairs is wrongly matched
(a) Viroids - RNA

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(b) Mustard - Synerigids
(c) Ginkgo – Archegonia
(d) Salvinia - Prothallus

AIPMT (Mains)-2012

Ans. (d) : Salvinia does not have prothallus because it is heterosporous in nature. Because it have two kind of spores, macro (large) and micro (small).

- The megaspore and microspore germinate and give rise to female and male gametophytes, respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods.
- The development of zygotes into young embryos takes place within the female gametophyte. This event is a precursor the seed habit considered on important step in evolution.

367. A well developed archegonium with neck consisting of 4-6 rows and neck canal cells, characterises

(a) Gymnosperms and flowering plants
(b) Pteridophytes and gymnosperms
(c) Gymnosperms only
(d) Bryophytes and pteridophytes

AIPMT-1995

Ans. (d) : Archegonium is the flask shaped female reproductive body of bryophytes and pteridophytes. Archegonium usually consist of a tubular neck and a swollen venter. It consists of a neck with one canal cells that produce a single egg (female gamete).

368. Pteridophytes differ from mosses/bryophytes in possessing

(a) Independent gametophyte
(b) Well developed vascular system
(c) Archegonia
(d) Flagellate spermatozoids

MP PMT-2013 / AIPMT-1993

Ans. (b) : Pteriodophytes differs from bryophytes and thallophytes in having well developed vascular tissue system. Vascular tissue plays an important role in conducting water and food material to the plant. Ferns are peteridophytes where as mosses are bryophytes. Mosses do not possess the specialized vascular system.

369. Which of the following are homosporous pteridophytes?

I. Selaginella **II. Lycopodium**
III. Salvinia **IV. Equisetum**

(a) I and IV only (b) II and III only
(c) II and IV only (d) III and IV only

AIIMS-2016

Ans. (c) : Homosporous pteridophytes produce only one type of spore in their sporophytes.
Lycopodium is a genus of clubmosses, belonging to the family Lycopodiaceae.
Equisetum is the only living genus belonging to the family Equisetaceae.
Ex. Lycopodium, Equisetum

- Salvinia and Selaginella are heterosporous

370. Ectophloic siphonostele is found in

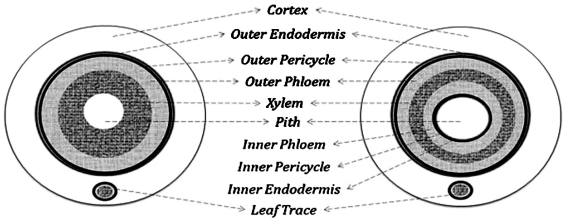
(a) Osmunda and Equisetum
(b) Marsilea and Botrychium
(c) Adiantum and Cucurbitaceae
(d) Dicksonia and Maidenhair fern

AIIMS-2008 / AIPMT-2005

Ans. (a) : Siphonostele are the principle types of steler orgnization in vascular plants. Ectophloic siphonostele a monostele type of siphonostele in which a ring of xylem occurs around the pitch and a ring of pholem outside the xylem.

- Siphnosteales are found in the stems of many ferns.
- **For example-** ***Osmunda and Equisetum.***

Amphiphloic siphonostele : - In this type of stele xylem is surrounded by phloem.



371. Match Column - I with Column- II and select the correct option from the codes given below.

	Column-I		Column-II
(A)	Chlorophyta	(i)	Equisetum
(B)	Lycopsida	(ii)	Chara
(C)	Phaeophyta	(iii)	Selaginella
(D)	Sphenopsida	(iv)	Ectocarpus

(a) A- (ii), B- (iii), C- (iv), D - (i)
(b) A- (iv), B- (i), C- (ii), D- (iii)
(c) A- (ii), B- (iii), C- (i), D- (iv)
(d) A- (iv), B- (i), C- (iii), D- (ii)

AIIMS-2013

Ans. (a) :
(A) Chlorophyta – (ii) Chara
(B) Lycopsida – (iii) Selaginella
(C) Phaeophyta – (iv) Ectocarpus
(D) Sphenopsida– (i) Equisetum

- **Chara** is a genus of **chlorophyta** green algae in the family Characeae. They are multicellular and resemble like land plants as they have stem and leaf-like structures.
- **Ectocarpus** is a genus of filamentous, marine brown algae, Ectocarpus belong to the **Phaeophyta**.
- **Selaginella** is a pteridophyta, it is also called spikemoss. They are seedless vascular plants. They are found mostly in shady areas, some species are also present in seasonal dry or xerophytic conditions. Selaginella belong to the **Lycopsida** class.
- **Equisetum** belong to the **Sphenopsida**. Sphenopsida is a class of vascular plants with fossil. Equisetum are commonly known as horsetails found mainly in wet areas.

372. Which of the following are heterosporous pteridophytes?

I. Lycopodium II. Selaginella III. Equisetum IV. Salvinia

(a) I and II only (b) II and III only
(c) III and IV only (d) II and IV only
(e) I and IV only

Kerala PMT-2014

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Ans. (d) : Selaginella & Salvinia are heterosporous pteridophyta. Heterospory is the production of spores of two different sizes & of two different developmental patternes - smaller male or microspores and larger female or megaspore. Heterospory is the most important evolutionary development in vascular plants because it has ultimately led to seed development.

373. Prothallus of the fern produces

(a) spores (b) gametes
(c) Both (a) and (b) (d) cones

JIPMER-2012 / BHU PMT (Screening)-2009

Ans. (b) : Prothallus is the gametophyte of the plant that is they are responsible for producing the gametes
At maturity, regions of prothallus develop into small separate sexual organ. Antheridia produces the male sex cells and archegonia produces the female sex cells.

374. In ferns, Meiosis takes place at the time of:

(a) Spore formation
(b) Spore germination
(c) Gamete formation
(d) Antheridia and archegonia formation

AIPMT-2000

Ans. (a) : Spores are present inside the sporangium which are formed by reduction division and spores are haploid in nature and germinate to produce a prothallus that represents the gametophytic generation. Antheridium and archegonia are borne on this prothallus. Thus, **meiosis takes place at the stage of spore formation.**

375. Which one of the following is a correct statement?

(a) Antheridiophores and archegoniophores are present in pteridophytes
(b) Origin of seed habit can be traced in pteridophytes
(c) Pteridophyte gametophyte has a protonemal and leafy stage
(d) In gymnosperms female gametophyte is free living

AIPMT (Screening)-2012

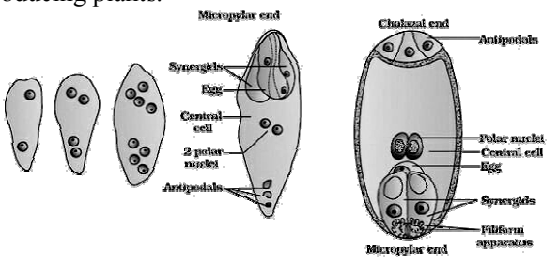
Ans. (b) : The origin of seed habit can be traced in pteridophytes. The development of zygote into young embryos takes place in the female gametophyte. This event is the precursor to the seed habit consider into an step of evolution.

376. Selaginella and Salvinia are considered to represent a significant step toward evolution of seed habit because

(a) Embryo develops in female gametophyte which is retained on parent sporophyte
(b) Female gametophyte is free and gets dispersed like seeds
(c) Female gametophyte lacks archegonia
(d) Megaspore possess endosperm and embryo surrounded by seed coat

AIPMT (Mains)-2011

Ans. (a) : The most successful method of sexual reproduction is the seed habit found in vascular plants. *Selaginella* and *Salvinia* are heterosporous meaning they produce two type of spores-
(a) **Microspores (small):-** Give rise to the male gametophyte.
(b) **Megaspores (Big):-** Give rise to the female gametophyte.
Heterospory is essential for seed habit. The female spore germinate within the sporophyte body and thus the germinated female gametophyte derives food and nutrition from the parent sporophyte. This retention of gametophyte inside the sporophyte is a precursor for seed habit.
So, Selaginella and Salvinia are an important evolutionary link between pteridophytes and seed-producing plants.



377. In eusporangiate ferns, sporangium is produced from

(a) a single, superficial sporangial initial
(b) a group of sporangial initial cells
(c) vegetative shoots
(d) root mass

AP EAMCET-2011

Ans. (b) : In Eusporangiate plants there is an enormous sporangium created from a few beginning cells delivering numerous spores. They divide into two component. The outer cells give rise to the cell wall whereas the sporogenous tissues arise from the inner cell wall. Ex. Lycopodium, Selaginella, Equisetum etc.

378. Pteridophytes are called vascular cryptogams, because they are non-seeded plants containing:

(a) Xylem and Phloem
(b) Only Xylem
(c) Only Phloem
(d) Neither Xylem nor Phloem

Karnataka CET-2012

Ans. (a) : Pteridophytes are vascular plants dispersing spores. They are sometimes referred to as cryptogams as they neither produce seeds nor flowers. Their mode of reproduction is cancelled or hidden. They are containing xylem and phloem. These tissues are together known as vascular bundles.

379. Dryopteris differs from Funaria in having:

(a) an independent gametophyte
(b) an independent sporophyte
(c) swimming antherozoids
(d) archegonia

J&K CET-2004

Ans. (b) : Dryopteris differs from Funaria in having an independent sporophyte. Dryopteris is a fern which belongs to pteridophyte and has spore bearing leaves while Funaria is a moss and they lack vascular system.

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380. Read the following five statements (A–E) and answer as asked next to them

(A) In Equisetum the female gametophyte is retained on the parent sporophyte

(B) In Ginkgo male gametophyte is not independent

(C) The sporophyte in Riccia is more developed than that in Polytrichum

(D) Sexual reproduction in Volvox is isogamous

(E) The spores of slime molds lack cell walls

How many of the above statements are right

(a) Four (b) One

(c) Two (d) Three

AIPMT (Mains)-2012

Ans. (b) : The pteridophytes, Equisetum has free-living, thalloid mostly photosynthetic gametophyte called prothallus.

- Ginkgo belongs to the category of gymnosperms. In gymnosperm, the male and female gametophytes do not have independent existence.
- Riccia is a liverwort in which simplest sporophyte consists of capsule only while Polytrichum is a moss in which sporophyte consists of foot, seta and capsule.
- Oogamy is present in Volvox
- Slime moulds spores bear cell walls.

381. Study the following lists and match correctly

List-I	List-II
A. Siphonogamy & zooidogamy	**i. Amphibiants of plant kingdom**
B. Living fossil	**ii. Arachis**
C. Liver worts	**iii. Ginkgo**
D. Double fertilization	**iv. Cycas**
	v. Laminaria

The correct match is:

	A	B	C	D
(a)	v	iv	i	ii
(b)	ii	iv	i	iii
(c)	iv	iii	ii	i
(d)	iv	iii	i	ii

AP EAMCET-2016

Ans. (d):		
Siphonogamy and Zooidogamy	–	Cycas
Living fossil	–	Ginkgo
Liver worts	–	Amphibians of plant kingdom
Double fertilization	–	Arachis

382. Match the following column I column II

	Column I		Column II
A.	**Anthoceros**	**1.**	**Alga**
B.	**Adiantum**	**2.**	**Hornwort**
C.	**Sargassum**	**3.**	**Gametophyte**
D.	**Prothallus**	**4.**	**Inferae**
E.	**Asterales**	**5.**	**Walking fern**

(a) A-2 B-5 C-1 D-3 E-4

(b) A-5 B-4 C-3 D-2 E-1

(c) A-5 B-1 C-2 D-4 E-3

(d) A-3 B-2 C-1 D-5 E-4

(e) A-5 B-4 C-1 D-2 E-3

CMC Vellore-2015

Ans. (a) :		
Anthoceros	–	Hornwort
Adiantum	–	Walking fern
Sargassum	–	Alga
Prothallus	–	Gametophyte
Asterales	–	Inferae

383. Coal is the fossil wood of

(a) cryptogamic plants (b) spermatophytes

(c) thallophytes (d) bryophytes

BVP-2011

Ans. (a) : Coal is fossilized wood of Lepidodendron belong to Lycopsida. They grew up to 40 meters in height. During their juvenile stages, these plants grew as unbranched trunks with thin leaves.

384. The branch of biology that deals with the study of fossil is called

(a) anatomy (b) embryology

(c) morphology (d) palaeontology

J&K CET-2010

Ans. (d) : The branch of biology that deals with study of fossil is called palaeontology. It is the scientific investigation of past history of life on Earth through the study of fossil remains of animals and plants.

385. The trabeculae found in Selaginella are the modification of

(a) Epidermal cells (b) Cortical cells

(c) Endodermal cells (d) Pericycle cells

VMMC-2011 / BHU PMT (Screening)-2009

Uttarakhand PMT-2009

Ans. (c) : The trabeculae found in Selaginella are the modification of endodermal cells. The innermost layer of the cortex is called endodermis. It comprises a single layer of barrel - shaped cells without intercellular spaces.

386. Antherozoids of Dryopteris are

(a) multi ciliated and coiled

(b) multi ciliated and sickle-shaped

(c) biciliated and coiled

(d) biciliated and sickle-shaped

Punjab MET-2009

Ans. (a) : Antherozoids of Dryopteris are multiciliated and coiled, which have a prominent vesicle and a nucleus. Dryopteris consists of a mature antheridium which is made up of a layer of jacket cells, with two ring shaped each composed of either one or two cap cells.

387. Gametophytic and sporophytic phasess are independent in

(a) pteridophyte (b) bryophyte

(c) gymnosperms (d) phaeophytes

JCECE-2008

Ans. (a) : Gametophytic & sporophytic phases are independent in pteridophyte. They exhibit dominant sporophytic generation with an inconspicuous gametophytic generation. The sporophyte is differentiated into root, stem and leaves.

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388. In pteridophytes, phloem is without
(a) bast fibers (b) sieve tubes
(c) companion cells (d) sieve cells
JIPMER-2013 / Manipal-2010

Ans. (c) : In pteridophytes, phloem is without companion cell. The companion cells are specialized parenchymal cells in the phloem tissue. They are nucleated living cells with several ribosome, plastids and mitochondria. These cell are present only in angiosperms.

389. The circinate vernation is the characteristic feature of ferns. It refers to
(a) coiling of young leaves
(b) arrangement of leaves on stem
(c) attachment of sori on leaves
(d) heterophilly
Rajasthan PMT-2005 / UP CPMT-2004

Ans. (a) : When in pteridophytes plants, the young leaves are coiled or tightly rolled but uncoil like a watch spring as these leaves grow. This condition of leaves is called circinate vernation.

390. Mesarch xylem is commonly found in
(a) fungi (b) ferns
(c) bryophytes (d) algae
Punjab MET-1999

Ans. (b) : Mesarch xylem are commonly found in fern. It develops in each direction from the center of the primary xylem's strand. Ferns stems and leaves have a mesarch form of development.

391. Dispersal of spores in fern takes place through
(a) annulus (b) stomium
(c) (a) and (b) (d) indusium
AFMC-2005

Ans. (c) : Dispersal of spores in fern takes place through both annulus and stomium. In ferns, sporangium consist of stalk and capsule, later is filled with sporocytes which undergo meiosis to produce haploid spores. The one layered wall of the capsule is thin and has a strip of cells called annulus. The cells of annulus have thickenings on the inner and radial walls or region of dehiscence of a fern sporangium. These regions are called stomium.

392. Antherozoids of pteridophyta are
(a) Much coiled and multiciliated
(b) Pear-shaped and biflagellate
(c) Cork screw-shaped and multiflagellated
(d) All of the above
BCECE-2011

Ans. (d) : Antherozoids of pteridophyta are All of the above. It is present in the gametophytic phase of cryptogams such as bryophytes and ferns and lower pteridophytes.

393. Sometimes, the fern plant arises from fern prothallus without fertilisation. This is an example of
(a) apospory (b) apogamy
(c) parthenocarpy (d) gametogenesis
BVP-2010

Ans. (b) : The apogamy is the process of formation of sporophyte from a gametophytic cell other than egg without fertilization. The prothallus is the gametophyte plant body of plants, like ferns.

394. How many meiosis occur in the sporangium of Nephrolepis ?
(a) 1 (b) 4
(c) 16 (d) Uncertain and variable
AFMC -2011

Ans. (a) : Only one meiosis occur in the sporangium of Nephrolepis. It is a type of fern whose main plant body is sporophytic which is differentiated into true roots, stem and leaves. During sporophytic phase adult plant produces diploid spores mother cells in the sporangium. Their main characteristic feature is the presence of sporophylls. These are leaves bearing sporangia. Several sporophylls condense to form a compact structure known as strobili or cones.

395. Elaters are not found in the sporangium of (1) sphagnum (2) Marchantia (3) selaginella (4) All of these
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2009

Ans. (d) : Elaters are absent in Sphagnum and Selaginella. The elaters are long, slender, filamentous, fusiform structures with tapering ends. They are present inside the capsule of bryophytes. These are hygroscopic in nature and helps in dispersal of spores in Marchantia.

396. Which of the following are not seed producers (1) Fern (2) Funaria (3) Ficus (4) Pinus?
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2009

Ans. (b) : Fern (pteridophyta) and Funaria are non-seed producing plants, while Ficus and Pinus are seed producing plants. In Ferns and Funaria, the spores function much like seeds which are produced in special structures called sporangia or special cup shaped structures called sori.

397. Selaginella nearly approaches seed habit because it shows (1) heterospory (2) retention of megaspore in mega sporangium till the development of young sporophyte (3) presence of ligulate leaves (4) sexual type of reproduction
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2009

Ans. (b) : Selaginella nearly approaches seed habit because it shows heterospory, where two different kinds of spores are produced, called microspores and megaspores, by the sporophyte, and the retention of female gametophyte on parent sporophyte for a considerable period of time is considered as a precursor to seed habit.

398. The species of the following plant, are sometimes described as 're-surrection plants':
(a) Pleopeltis (b) Lycopodium
(c) Equisetum (d) Selaginella
BHU PMT (Mains)-2005

Ans. (d) : The plants of Selaginella are marketed as curiosities in the name of re-surrection plants. The resurrection plant is any plant that can survive in dehydration conditions. It is a plant species native to North America, Central and South America, and sold as a novelty. It is used as an antimicrobial to treat sore throat and colds.

399. A venter is a part of :
(a) sporophyte (b) sporangium
(c) antheridium (d)
BHU PMT (Mains)-2005

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Ans. (d) : A venter is a part of archegonium. They may also have a stalk. The neck contains neck canal cells and is capped by four cover cells. The venter contains a ventral canal cell and an egg. The sterile jacket has a cap cell, which disintegrates when turgor pressure rises (when surrounded by rain water).

400. The dominant generation in pteridophytes is
(a) sporophytic (b) gametophytic
(c) zygotic (d) None of these
UP CPMT-2012

Ans. (a) : In pteridophytes, dominant free-living generation is diploid sporophytic generation. They are generally herbaceous and rarely woody. Sporophyte is differentiated into true roots, stem and leaves. The sporophyte develop from the zygote which is formed by the fusion of haploid male gamete with the haploid female gamete.

401. The bladder serving as floats and for trapping insects is found in
(a) Zizyphus (b) Utricularia
(c) Nephenthes (d) Acacia
J&K CET-2009

Ans. (b) : Ultricularia is also known as the bladderwort, which is subrmerged aquatic insectivorous plant. Its rootless, floating stem bears highly dissected leaves. A portion of leaf is modified into sac-like bladders of about 1.3 mm in diameter. Each bladder is guarded by small valve, which opens inwardly. The bladder help in trapping prey and water.

402. Prothallus of Petridophytes is
(a) conspicuous, small, multicellular, free-living, photosynthetic thalloid gametophyte
(b) inconspicuous, small, multicellular, free-living, photosynthetic thalloid gametophyte
(c) inconspicuous, large, unicellular, free-living, photosynthetic thalloid gametophyte
(d) inconspicuous, small, multicellular, free-living, non-photosynthetic thalloid sporophyte
J&K CET-2014

Ans. (b) : Prothallus of pteridophytes is inconspicuous, small, multicellular, free-living, photosynthetic thalloid gametophyte. The magagametophytes (prothallus) produces the male sex organs called antheridia and female sex organs called archegonia.

403. The green upright sterile hair-like structures among the antheridia of are known as:
(a) apophysis (b) perigonial leaves
(c) trabeculae (d) paraphyses
JIPMER-1997

Ans. (d) : Paraphyses is a sterile hairlike filament present among the reproductive organ in many lower plants, especially bryophytes, algae & fungi.
It provides protection and in some species may be involved in dehiscenece.

404. A fern differs from a moss in having
(a) Swimming archegonia
(b) Swimming antherozoids
(c) Independent gametophytes
(d) Independent sporophytes
JIPMER-2012 / BHU PMT (Screening)-2009
Uttarakhand PMT-2009

Ans. (d) : Ferns contain a dominant sporophyte whereas mosses contain a dominant gametophyte. By sporophyte dominant it means that the sporopyte is larger and lives a longer time than the gametophytic generation. Fern and moss both have swimming antherozoids. They swim in the water and fertilise with the egg of the archegonium.

405. In which one of the following the male and female gamerophytes don't have free-living independent existence?
(a) Pteris (b) Funaria
(c) Polytrichum (d) Cedrus
BHU PMT (Screening)-2010

Ans. (d) :. In gymnosperms, the male and female gametophyte do not have an independent existence as they remain within the sporangia retained on the sporophyte's. Cedrus is a gymnospermic plant. In cedrus the female gametophyte retain within the megasporangium and male gametophyte within the microsporangium.

406. Club moss is the common name of :
(a) Selaginella (b) Funaria
(c) Potamogeton (d) Lycopodium
JIPMER-2003

Ans. (d) : Lycopodium belongs to the class Lycopsida of group Pteridophyta. They are commonly called "club moss". The plant body is differentiated into roots, stems and leaves.

407. In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result of which
(a) there is no change in success rate of fertilization
(b) there is high degree of sterility
(c) one can conclude that the plant is apomitic
(d) Self - fertilization is prevented
Rajasthan PMT-2010

Ans. (d) : In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result, of which self-fertilization is prevented.
The haploid gametophyte produces both male and female gametes but cross fertilization occurs because of the fact that archegonia (producing egg) and antheridia (producing antherozoids) mature at different times.

408. Azolla is used as a biofertilizer because it
(a) multiplies very fast to produce massive biomass
(b) has association of nitrogen-fixing Rhizobium
(c) has association of nitrogen - fixing cyanobacteria
(d) has association of mycorrhiza
Rajasthan PMT-2010

Ans. (c) : Biofertilizers are microbe-containing compounds that help to promote plant and tree growth by increasing the supply of vital nutrients to plants. The main sources of biofertilizers are bacteria, fungi and cyanobacteria. Azolla is water fern which is also used as a biofertilizer. Symbiotic cyanobacteria *Anabaena azollae* is responsible for nitrogen-fixation which increases the fertility of the soil and in turn enhances the yield. *Azolla pinnata*, is used as an excellent fertilizer in rice field.

409. Which of these does not show heterospory?
(a) Pinus (b) Selaginella
(c) Dryopteris and moss (d) sunflower
AMU-2011

Ans. (c) : The Dryopteris and Moss form monoecious gametophytes as all spores are uniform. The heterospory is the production of two different types of spores by the sporophytes of land plants. They are mostly found in some pteridophytes and all seed plants, i.e. Gymnosperms and Angiosperms, whereas the Bryophytes are not heterosporous.

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410. The present day higher green plants are believed to have evolved from
(a) ferns (b) green algae
(c) liverworts (d) mosses
AMU-1999

Ans. (a) : The present day higher green plants are believed to have evolved from ferns. They are believed to be originated during the late Palaeozoic era (about 250 million years ago).

411. Telome theory of Zimmerman (1930) applies only to:
(a) bryophytes (b) pteridophytes
(c) tracheophytes (d) all plants
VMMC-2006

Ans. (b) : The 'Telome theory' was proposed by Zimmerman (1930), he explained the origin of the megaphyll as well as of reproductive branches in vascular plants i.e. pteridophytes. The complex structures such as leaves (megaphylls) roots, reproductive organs, and other vascular plants evolved by the modification of terminal branches (telomes) of stems.

412. Seed habit is developed first time in :
(a) some ferns (b) some pinus
(c) some monocots (d) some dicots
Rajasthan PMT-1998

Ans. (a) : Seed habit was developed first time in some ferns. It is one of the most important aspects of evolution of land plants. The origin and evolution of seed habit started in late Devonian times. The earlier seed plants or plants with seed-like structures were found to have existed in the Devonian seed ferns - Lyginopteris, an archetypal Pteridosperm.

413. The rhizoids in Funaria are
(a) tuberculated
(b) unicelluar and simple
(c) distinct, branched and coenocytic
(d) multicellular and oblique septate
UP CPMT-2001

Ans. (d) : In funaria, root like structures called rhizoids are present. In has a height of 3-5 cm, a radial symmetry with a differentiation of an axis or stem, leaves or phylloids and multicellular colorless branched rhizoids with oblique septa. These are primitive multicellular, autotrophic, shade loving, amphibious plants.

414. Fern gametophyte bears:
(a) archegonia (b) antheridia
(c) sporangia (d) Both (a) and (b)
Manipal-2000

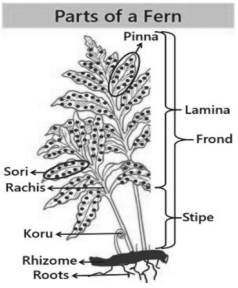
Ans. (d) : Fern gametophyte bears Both (a) and (b). The gametophyte of fern is called prothallus, which bears both archegonia and antheridia. Sporangia are found in the sori of sporophyte. In ferns, the antheridia are above the rhizoids and the archegonia are below the apical notch. They are found on the lower surface of the prothallus.

415. Which of the following plant shows multiple epidermis:
(a) Palm (b) Ficus
(c) Croton (d) Cucurbita
Uttarakhand-2005

Ans. (b) : The outermost protective layer which minimizes the loss of water by transpiration is called epidermis. Some plants, like Ficus elastica and Peperomia, which have periclinal cellular division within the protoderm of the leaves, have an epidermis with multiple cell layers.

416. Leaf in young condition in fern is called
(a) scale leaf (b) sporophyll
(c) circinate ptyris (d) none of these
CMC Ludhiana-2008 / AMU-2007

Ans. (c) : In ferns, the leaves during young conditions are called Circinate ptyris. It happens due to hyponasty in the fern leaves. The hyponasty is an upward bending or uncoiling of leaves resulting from greater growth of the lower side.



417. Haploid brown, hairlike, delicate unicellular outgrowths are:
(a) root hairs of gymnosperms
(b) paraphysis of mosses
(c) root nodules of pulses
(d) rhizoids of fern plants
AP EAMCET-2004

Ans. (d) : Haploid brown, hairlike, delicate unicellular outgrowths are rhizoids of fern plants.
The rhizoids are found in the gametophyte of fern but after an evolutionary change, they develop in the root hairs of vascular plants in their sporophytic stage.

418. The prothallus of Pteris is mostly:
(a) dioecious (b) monoecious
(c) synoecious (d) protogynous
Haryana PMT-2002

Ans. (b) : The prothallus of Pteris is mostly monoecious. It carries sex organs, including male antheridia and female archegonia. It is autotrophic in nature. It is thick in one cell normally formed by the heart or kidney and has no roots, stems or leaves, but it has rhizoids.

419. A tree fern is:
(a) Adiantum (b) Dryopteris
(c) Cyathea (d) Asplenium
Haryana PMT-2002

Ans. (c) : Cyathea is a genus of tree ferns, belongs to the order Cyatheales. The genus name Cyathea is derived from the Greek word 'Kyatheion', meaning "little cup", and refers to the cup-shaped sori on the underside of the fronds. They are mostly terrestrial ferns, usually with a single tall stem.

420. If number of chromosome in foot of fern embryo is 8, what should be the number in its spores?
(a) 4 (b) 8 (c) 23 (d) 16
Haryana PMT-2004 / Manipal-2003

Ans. (a) : The number of chromosomes in the foot of a fern embryo (2n) = 8; The number of spores (n) = 4. In ferns the embryo is a diploid structure as it is formed by the fusion of gametes while the spores are haploid structures formed due to meiosis in diploid spore mother cell.

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421. A mature ligule having a prominent basal portion is called
(a) trrichocyst (b) heterocyst
(c) rhizophore (d) glossopodium
Manipal-2013

Ans. (d) : An elongated cell structure that is found at the base of ligule is called glossopodium. It is found in many species Selaginella. In Sellaginella, glossopodium is a bulb-like minute structure which is found at the base of the ligule.

422. Flagellate male gametes are present in the following except:
(a) Funaria (b) Dryopteris
(c) Pinus (d) none of these
JIPMER-1995

Ans. (c) : In Pinus, after pollination, the pollen tube grows and the generative cells divides to form a stalk cell and body cell. The body cell then divides to form two non-flagellate, male gametes.

423. Sporophyte of Dryopteris produces:
(a) seeds (b) spores
(c) gametes (d) none of these
JIPMER-1995

Ans. (b) : Sporophyte is a diploid, multicellular spore producing phase in the life cycle of the plant body. The haploid spore which give rise to the gametophyte which is the monoecious prothallus and bears sex organs on its ventral side. After fertilization, they give rise to the sporophyte which is the dominant asexual member in the life cycle of the plant.

424. Sex organs in Pteris are produced on:
(a) dorsal side of the prothallus
(b) ventral side of the prothallus
(c) margins of the fertile leaflets
(d) apices of sporophytic stem
AP EAMCET-2001

Ans. (b) : The cells of a prothallus contain chloroplasts. Therefore, it is photosynthetic and independent. The prothallus (gametophyte) produces male sex organs (antheridia) and female sex organs (archegonia) during sexual reproduction. These develop on the lower surface facing the soil. It is generally monoecious and the sex organs are developed on the ventral surface. Sex organs are exposed directly to moisture which is needed for the development and dehiscence.

425. Reduction (meiotic) division in Pteridophyta occurs:
(a) during gamete formation
(b) after spore formation
(c) during spore formation
(d) after gamete formation
AFMC-2004

Ans. (c) : Meiosis in pteridophytes occur during spore formation. It is the turning point in the life cycle. The diploid sporophytic generation ends with meiosis and the new haploid gametophytic generation begins with the formation of haploid spore. The spore (n) on germination produces haploid fern prothallus.

426. Which of the following is found in fern?
(a) Eustele (b) Atactostele
(c) Dictyostele (d) None of these
CG PMT-2006

Ans. (c) : The dictyostele is found in fern. It is a hollow stele with overlapping leaf gaps so the vascular cylinder appears as a hollow network of strands called meristeles.

427. In ferns and mosses, movement of antherozoids towards female component is called.
(a) phototaxis (b) chemonastic
(c) hydrotropism (d) thigmotropism
Haryana PMT-2006

Ans. (b) : The antherozoids of ferns and mosses are stimulated by special chemicals this movement is known as chemonastic. It is the nastic movement shown by plant in response to external chemical stimuli. The antherozoids are attracted towards archegonia in a fern plant due to chemonastic movement.

428. A tree growing in Indian Botanical Garden, Sibpur (Howrah, Calcutta) with age over 200 yr, circumference 404m, prop roots 1,600 and whose main stem has decayed is
(a) Ficus benghalensis
(b) Ficus religiosa
(c) *Eucalyptus regnans*
(d) No such tree exist
CMC Vellore-2007

Ans. (a) : *Ficus benghalensis* is also called the Great Banyan tree. The fruit is like a small fig and is eaten by some people. It tastes sweeter than fig. They grow from the little wet dust deposits on buildings because birds carry them around for eating. The fruit is red and when ripes gets softer.

429. Rhizophore of Selaginella is
(a) root (b) stem
(c) leaf (d) organ sui genesis
CG PMT-2011

Ans. (d) : The most accepted view is that rhizophores are organ sui-genesis that is a new organ of independent origin (Bower 1908, Goebel 1905). They are leafless and positively geotropic organs that have localised origin and develop from meristems.

430. Which pteridophyte is called as horse tail?
(a) Equisetum (b) Lycopodium
(c) Marsilea (d) Selaginella
Manipal-2010

Ans. (a) : Equisetum is called as horsetail as their branched species somewhat resembles a horse's tail. It is a living fossil as it is the only living genus of the entire class Equisetopsida.

431. Tracheophyta consists of
(a) bryophytes only
(b) pteridophytes only
(c) gymnosperms and angiosperms
(d) Both (b) and (c)
CMC Vellore-2009

Ans. (d) : The tracheophytes are plants, which have vascular tissue system. It includes pteridophyta, gymnosperms and angiosperms. The vascular tissues include xylem and phloem. They are conducting tissues of plants.

432. Leaf gap in the vascular cylinder in ferns is
(a) air spaces
(b) parenchymatous zone
(c) collenchymatous zone
(d) area exclusive of phloem
CMC Ludhiana-2011

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Ans. (b) : Leaf gap in the vascular cylinder in ferns is parenchymatous zone. The parenchymatous region left behind in the main stele after the departure of the leaf traces called leaf gap. The point at which the stem bundle diverges from the vascular cylinder towards the leaf is a leaf gap, called a lacuna.

433. Botanical name of 'Sanjeevani' is
(a) Selaginella chrysocaulos
(b) Selaginella bryopteris
(c) Selaginella chrysorhizos
(d) None of the above

CMC Ludhiana-2008

Ans. (b) : Botanical name of 'Sanjeevani' is Selaginella bryopteris. The sanjeevani is known as a magical herb that cures serious nervous system problems. Till now the exact sanjeevani plant is not identified but there are several candid plant species that may be sanjeevani plant. These plants include Selaginella bryopteris. They grow on the hills of tropical areas, particularly the Arawali mountain terrains from east to west in India.

434. The rhyniophytes have
(a) leaves like today fern
(b) flourishing group of plants
(c) sporangia at the tips of thin branches
(d) sporangia near the base of shoot

JCECE-2014

Ans. (c) : Rhynophytes are member of the Rhynopsida class. They have vascular structures the sporangia which are branched stalks are found in the sporophytes. Rhyniophytes have sporangia at the tip of thin branches leaves and true roots are absent. The sporangia consist of spores and spores are categorised into microspore and megaspores.

435. Seed habit was first originated in members of :
(a) ferns (b) cycadofilicales
(c) gymnosperm (d) angiosperm

BVP-2006

Ans. (a) : The seed habit in pteridophytes is considered an important step in evolution which is due to heterospory. Heterospory is the occurrence of two kinds of spores in the plant. One smaller are called microspore and the larger are called as megaspore as in selaginella and salvinia. Seed habit first originated in seed ferns or pteridosperm.

436. Most primitive members in which roots are not present, is:
(a) Psilotum (b) Rhynia
(c) Lycopodium (d) Selaginella

BHU PMT (Screening)-2005

Ans. (b) : Early vascular plants like Rhynia date back to the lower Devonian. The Rhynia plants have short, upright branches, Rhynia is more primitive than psilotum and both lack true roots.

437. Which one of the following pairs of plants are not seed producers?
(a) Funaria and Ficus
(b) Fern and Funaria
(c) Funaria and Pinus
(d) Ficus and Chlamydomonas

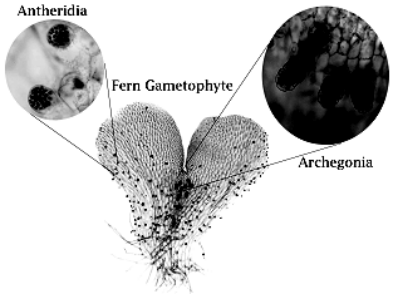
JIPMER-2013

Ans. (b) : The seed producing plants belong to spermatophyta, i.e. angiosperms and gymnosperms. While, the bryophytes, thallophytes and pteridophytes lack these features and thus, they do not reproduce by producing seeds.
Fern and Funaria do not bear flowers thus, they do not bear seeds. Fern and Funaria belongs to pteridophytes and bryophytes respectively. The spores functions like seeds which are produced in special structures called sporangia or special cup-shaped structures called sori.

438. Fern gametophyte bears:
(a) archegonia (b) antheridia
(c) sporangia (d) both (a) and (b)

JCECE-2005

Ans. (d) : The sex organs the antheridia and archegonia, are carried by the gametophyte of the fern or prothallus. So they referred to it as homothallic while archegonia are the female reproductive organs antheridia are the male sex organs.



439. Heterospory and seed habit are exhibited by a non - flowering plant which also possess:
(a) bract (b) ligule
(c) petiole (d) spathe

VMMC-2006, 2003
AMU-2006

Ans. (b) : The development of megaspores and microspores two different spore size is known as heterospory. It is true of bryophytes. Some pteridophytes, including selaginella, are where heterospory first appeared. Its common names Include clubmoss and spike moss. On the adaxial side of its leaves the ligules is an outgrowth that resembles to a flap.

440. First vascular plant is
(a) Thallophyta (b) Bryophyta
(c) Pteridophyta (d) Spermatophyta

AMU-2009

Ans. (c) : Terrestrial or land plant are other names for vascular plants. Vascular plants are those plants that have vascular tissues like xylum and phloem. The first vascular plant is Pteridophyta. They are also called first vascular cryptogams or spore-bearing vascular plants.
Vascular plants contains conducting system for the transport of minerals, water and food materials. They include gymnosperm and angiosperms and plants that reproduce through spores i.e. the fern.

441. In the chlorophyta, the reserve food of protein surrounded by starch, form a compact body termed as -
(a) paramylum (b) pyrenoid
(c) volutin (d) eye spot

JIPMER-1999

Ans. (b) : In the chlorophyta, the reserve food of protein surrounded by starch, form a compact body termed pyrenoid. Pyrenoid contain protein besides starch.

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E. Gymnosperms

442. In Pinus/Cycas/gymnosperms, the endosperm is
(a) triploid (b) haploid
(c) diploid (d) tetraploid
TS EAMCET-28.09.2020 Shift-II / JIPMER - 2013
Punjab MET-2010 / Punjab MET-2008
Rajasthan PMT-1998 / AMU-2009
CG PMT-2011, 2007 / Haryana PMT-2007
Rajasthan PMT-2006 / BVP-2005 / AIPMT-1988
Haryana PMT-2004 / MGIMS Wardha-2003
Manipal-2002 / AMU-2002 / AP EAMCET-2001
AIPMT-1999 /AP EAMCET-1998 / JIPMER-1995

Ans. (b) : In pinus/cycas/gymnosperms the endosperm is haploids because it is produced before fertilization. In the gametophyte phase, which is haploid, male and female organs develop and produce egg and sperm through simple mitosis for sexual reproduction. When these unite in fertilization, the zygote then develop into the diploid sporophyte phase, which produce unicellular spore through meiosis.

443. Gymnosperms are called naked seed plants because these lack
(a) cotyledon (b) endosperm
(c) ovary wall (d) testa
BVP-2012 / CMC Ludhiana-2012/ UP CPMT-2011
MGIMS Wardha-2011 / BVP-2010
BHU PMT (Mains)-2010 /UP CPMT-2010
BHU PMT (Screening)-2009 / BVP-2009
Uttarakhand PMT-2009 / UP CPMT-2004
Rajasthan PMT-2004 / MGIMS Wardha-2004
JIPMER-2003 / Rajasthan PMT-2000
MP PMT-2009, 1996 / JIPMER-1999

Ans. (c) : Gymnosperms are the vascular plants with an exposed ovule. They are called naked seed plants because they lack ovary wall. The botanical term "gymnosperms" means "naked seeds" in Greek.
Gymnosperms include species such as conifers and cycads that do not enclose their seed in fruits.

444. Which of the following is a living fossil?
(a) Pinus (b) Gnetum
(c) Ginkgo (d) Riccia
Assam CEE-2014 / CG PMT-2009
AMU-2009 / Punjab MET-2008
Punjab MET-2007 / JIPMER-2006
AMU-2006 / Uttarakhand-2005
Rajasthan PMT-2001 / AMU-2001
Haryana PMT-2000 / Rajasthan PMT-2000, 1998

Ans. (c) : Ginkgo commonly called as "Ginkgo biloba" is also known as "maiden-hair tree" is a species of gymnosperm. It is the lost living species in the order Ginkgo ales. It is the oldest living seed plant. It is cultivated for its edible seeds in some parts of China and Japan. The plant body of ginkgo is saprophytic & the saprophytes resembles several conifers in general habit. Branches are dimorphic.

445. Male cone of Pinus possesses :
(a) mega sporophylls (b) microsporophyllus
(c) anthers (d) ligules
Manipal-2014 / BCECE-2012 /UP CMPT-2012
BVP-2012 / VMMC-2012 / BCECE-2010
JIPMER-2009 / CG PMT-2008/ BVP-2008
Rajasthan PMT-2008
CG PMT-2008
UP CPMT-2012, 2008
BHU PMT(Screening)-2006
MGIMS Wardha-2006
BHU PMT (Screening)-2005

Ans. (b) : Male cones consists of a spiral arrangement of tightly packed pollen-bearing structures or microsporophylls formed around a central axis. The lower surfaces of the microsporophylls have two chambers called microsporangia in which the pollen develops.

446. Which of the following is not the feature of gymnosperms?
(a) Parallel venation
(b) Perennial plants
(c) Distinct branches (long and short branches)
(d) Xylem with vessels
JIPMER-2009 / UP CPMT-2012
VMMC-2012 / VMMC-2011
UP CPMT-2008 / Rajasthan PMT-2008
CG PMT-2008 / BHU PMT(Screening)-2005

Ans. (d) : Most of the gymnosperms are tall, evergreen trees, none of them are herbs. Gymnosperms are characterized by parallel venation with almost no branching veins wherein secondary veins run parallel to each other. They are vascular plants & have xylem and phloem for transport of water & food respectively. The xylem tissue of gymnosperms consists of tracheids only, vessels are absent.
• Parallel venation is a vein configuration in which the veins run parallel to one another. Mostly found in monocot leaves.
• A perennial plant is a plant that lives more than two years.

447. *Cycas revoluta* is popularly known as:
(a) date palm (b) sago palm
(c) sea palm (d) royal palm
JIPMER-2013 / MGIMS Wardha-2012
UP CPMT-2010 / VMMC-2007
Rajasthan PMT-2005 /Rajasthan PMT-1999
UPCPMT-2002

Ans. (b) : *Cycas revoluta*, popularly known as "sago palm". It is not a real palm, but a cycad. It is a slow - growing evergreen, long lived, medium- sized palm like plant. It is the most popular species in the genus Cycas. This plant is popularly known as "King sago".

448. Which one of the following is categorized under living fossils?
(a) Selaginella (b) Metasequoia
(c) Pinus (d) Cycas
HP CET-2013 /AFMC -2011
Haryana PMT-2011 / Rajasthan PMT-2007
VMMC-2003 /Haryana PMT-2000

Ans. (d) : Cycas are often known as "living fossils" since they have survived virtually unchanged throughout the years. Cycads, a plant family with roughly 300 species are thought to be only a few million years old & are regarded as one of the living fossils.

449. Which of the following is absent in the primary and secondary structure of stem of Pinus?
(a) Sieve tubes (b) Mucilage duct
(c) Companion cells (d) Phloem parenchyma
AP EAMCET-2015 / AFMC-2000
BVP-2001 / Rajasthan PMT-1995

Ans. (c) : In gymnosperms, (including Pinus), the companion cells are lacking in the phloem. The albuminous cells are found in place of companion cells. Sieve cells in gymnosperms are associated with albuminous cells which lack starch.

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450. Winged pollen grains are found in:
(a) Pinus (b) Selaginella
(c) Cetraria sp. (d) Parmelia sp.
BHU PMT (Screening)-2011 / MGIMS Wardha-2011
CG PMT-2007 / BHU PMT-2003 / BVP-2002

Ans. (a) : The pinus pollinate profusely giving rise to large number to pollens. The pollen grains of pinus are large due to the presence of sacs or bladders, giving them a winged format. It has two prominent walls, the outer exine made up of sporopollenin which is referred to as one of the most resistant organic material. The inner intine layer is made of cellulose and pectin. Winged pollen grain are found in pinus.

451. The smallest plant division-Gymnosperm has how many species.
(a) 640 (b) 900
(c) 100 (d) 300
VMMC-2013/JIPMER-2003/NEET-1996/IPMT-1996

Ans. (b) : Gymnosperms are a group of plants that produce seeds not enclosed within the ovary or fruit. It originated about 200 million years ago and were dominant species at that time. There are around 900 living species of this group. Zamia pygmia is the smallest gymnosperm.

452. Resin or turpentine oil is obtained from
(a) Pinus (b) Cedrus
(c) Cycas (d) None of these
Manipal-2011 /CG PMT-2006 / AIPMT-1992
MGIMS Wardha-2003 /Rajasthan PMT-2001

Ans. (a) : Turpentine oil is the liquid formed by the distillation of waxes collected from the pine tree or Pinus. Pinus is a coniferous gymnosperm. The stem of the Pinus is branched containing resin canals that are found in the cortex region. These canals secrete resins that contain turpentine oil. These canals are the type of schizogenous cavities in their origin. It is utilised as a mixture and oil based dyes. Blue pine tree on pinus wellichiana and pinus longifolia are commercial sources of extracting turpentine oil. Dried turpentine is used for flavoring foods and beverages. Resin is a hydrocarbon extract or secretion produced by confers.

453. Female cone of pinus is a
(a) Modified needles
(b) Modified long shoot
(c) Modified dwarf shoot
(d) Modified scale
JIPMER-2012 / BVP-2009
Uttarakhand PMT-2009 / BHU PMT (Screening)-2009

Ans. (b) : Pinus is a conifer that contains resinous substance. They are monoecious in nature which means they have male and female cones on the same tree. The female cone of Pinus is formed by the aggregation of meagasporophylls, which bear ovules. Each megasporophyll consists of a lower bract scale and a larger upper ovuliferous scale. The male and female reproductive structure are microsporangiate or male strabili and megasporangiate of female strobili respectively.

454. The young meristematic cells of leaves and stem of gymnosperm has 16 chromosomes, the number of chromosomes in the endosperm of the same gymnosperm shall be:
(a) 16 (b) 32
(c) 24 (d) 8
MP PMT-2013 / Manipal-2008
BVP-2007 / AIPMT-1996

Ans. (d) : The emergence of endosperms on haploid megaspores prior to fertilization is a characteristic features of gymnosperms. Here, the endosperm is gametophytic tissue and is haploid. A gymnospermic stem & leaves are somatic organs which have diploid chromosome number in its cells. According to question, the no. of chromosomes in leaf is 16 (2n) which means the haploid chromosome number is 8 (n). The megaspores, being the product of meiosis in megaspore mother cell (2n) are haploid & therefore chromosome number of its endosperm is n = 8.

455. The longest gymnospermic plant is :
(a) Sequoiadendron (b) Pinus
(c) Cycas (d) Cinchona
NEET-2016 Phase-I / Rajasthan PMT-1999
VMMC-2002 / AMU-2001

Ans. (a) : *Sequoiadendron gigantenum* also known as the "giant sequoia" is the largest and sole living species in the genus Sequoiadendron and one of the the species of coniferous trees known as redwoods, classified in the family Cupressaceae. It is known for its massiveness size (50-85 m). Due to their massive size, the branches at the bottom usually die from being in shade & are also retained.

456. Mycorrhiza is useful association because:
(a) it fixes atmospheric nitrogen
(b) it enhances absorption of nutrients from soil
(c) it kills pathogens
(d) it provides resistance against drought
CMC Ludhiana-2008 /DUMET-2006
AMU-2006 /UP CPMT-2003/BHU PMT-2001

Ans. (b) : Mycorrhiza are the symbiotic association between roots of higher plants & fungi. The fungi helps in absorbing water & nutrients from the soil. Mycorrhiza absorb mineral nutrients especially phosphorus from soil.

457. Chilgoza pinus is:
(a) Pinus gerardiana (b) Pinus roxburghi
(c) Pinus wallichiana (d) Pinus merkurii
BHU PMT (Screening)-2005 /J&K CET-2001
Rajasthan PMT-2001 /AMU-1999

Ans. (a) : Pinus gerardiana is commonly known as chilgoza pine. The trees are tall with usually deep, wide and open crowns with erect branches. The leaves are needle like, in groups of three and spread stiffly. They are glossy green on the outer surface with blue-green stomatal lines on the inner face. Seeds are found with a thin shell and a rudimentary wing.

458. Which of the following plants produces seeds but not flowers : -
(a) Maize (b) Mint
(c) Peepal (d) Pinus
Rajasthan PMT-2007/AIPMT-2002
JIPMER-2002/AIPMT-1992

Ans. (d) : Gymnosperms are seed-producing plants but they do not bear flowers.
Pinus is a gymnosperm and ovules lie uncovered on the megasporophyll, hence these do not have flower. However, it produces seeds (from ovule after fertilization) but maize, mint and Peepal bear flower, fruit and seeds.

459. Assertion (A) : Fertilization in cycas is called Siphonogamy and zooidogomy
Reason (R) : Male gametes are multiciliate and carried by pollen tube

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(a) Both A and R are true and R is the correct explanation to A.
(b) Both A and R are true but R is not the correct explanation to A
(c) A is true but R is false
(d) A is false but R is true

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Gymnosperm:-
In cycas fertilization is siphonogamous i.e., by the pollen tube and zoodogamous e.g. -by the motile male gametes.
In cycas each spermatozoid (male gamete):- Top shaped, broad at the posterior and narrow at the anterior, 5-6 ciliary band 180-210μ in diameter. Largest in the plant and animal kingdom. haploid and multiciliated. Motile gamete are last cell of gametophyte generation.

460. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :
Assertion A : In gymnosperms the pollen grains are released from the microsporangium and carried by air currents.
Reason R : Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are discharged and pollen tube is not formed.
In the light of the above statements, choose the correct answer from the options given below :
(a) A is false but R is true.
(b) Both A and R are true and R is the correct explanation of A .
(c) Both A and R are true but R is NOT the correct explanation of A.
(d) A is true but R is false.

NEET (UG) 07.05.2023

Ans. (d) : Gymnosperms laterally means naked seed i.e without ovary.
- Gymnosperm show connection between pteridophyte and gymnosperm
- Gymnosperms are wind pollinated. insect pollination common in angiosperms, is nearly absent in gymnosperms
- The female gametophyte or endosperm in post fertilization stages remains haploid in gymnosperm.
- Pollen grains are deposited on stigma either due to closeness of the anthers to the stigma or by pollinating agent.
- The attachment of the pollen on the stigma depends upon its wall sculpture and stickiness. In wet stigma adhesion is mostly a mechanical process.
- The stigmatic surface also provides boron and calcium which are required for germination.

461. Which unbranched tree hosts heterocystous symbiont in its modified roots ?
(a) Pinus (b) Cycas
(c) Ginkgo (d) Cedrus

TS EAMCET-30.07.2022 Shift-II

Ans. (b) : Cycas hosts heterocystous symbiont in its modified roots. Heterocysts are specialized nitrogen-fixing cells formed during nitrogen starvation by some filamentous cyanobacteriea. Heterocysts is the sites for nitrogen fixation under aerobic conditions.

462. Roots in some gymnospermic genera have fungal association in the form of A and B. Here A and B refers to_____
(a) A–lichen; B–cycas
(b) A–lichen; B–pinus
(c) A–mycorrhiza; B–cycas
(d) A–mycorrhiza; B–pinus

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : Pinus had fungal association to form mycorrhiza which helps in absorption of water and minerals. Mycorrhiza is a symbiotic association between plant roots and fungi. Their major role is to enhance nutrient & water uptake by the host plant by exploiting a larger volume of soil than roots alone can do.
Cycas:- Cycas have symbiotic association with the blue-green algae forming coralloid root.
Lichen:- Lichen is formed by the symbiotic relationship between fungus and an algae or cyanobacterium.

463. Assertion (A) : Cycas shows siphonogamous oogamy and zooidogamy.
Reason (R) : The pollen grains are released and pollination is anemophilous.
Pollen tube carrying male gametes grow towards archegonia in the ovule.
The correct option among the following is Options:
(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-28.09.2020 Shift-I

Ans. (a) : Cycas exhibits all siphonogamous, oogamous and zooidogamous types of fertilization.
Siphonogamy is a type of reproduction in plants, in which pollen tube gets developed from the transfer of male cells into the egg.
In zooidogamy, male gametes or antherozoids swim through a path of the water to the female gametes or archaegonia.

464. Gymnosperms lack which of the following ?
(a) Sieve tubes (b) Tracheids
(c) Sieve cells (d) Albuminous cells

AP EAMCET-25.09.2020 Shift-II

Ans. (a) : Seive tubes are specialized cells that helps the phloem, a highly organized tissue that transports organic molecules produced during photosynthesis.
- In the gymnosperms, having not seive tubes or companion cells.

465. Choose the correct option for the statements for Mycorrhiza:
(i) It absorbs phosphorus from soil.
(ii) It forms root nodules with the association of Rhizobium.
(iii) They are resistance to root-borne pathogens, tolerance to salinity & drought.
(iv) They fix atmospheric nitrogen.
(a) (i) and (ii) (b) (i), (ii) and (iii)
(c) (i) and (iii) (d) (ii) and (iv)

GUJCET-2020, 2008

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Ans. (c) : Mycorrhiza are symbiotic association between higher plant roots & fungi. Their major role is to enhance nutrient & water uptake by the host plant. It absorbs phosphorus from soil and they are resistance to root-borne pathogens, tolerance to salinity, drought and an overall increase in plant growth and development. There are two types of mycorrhizal- ectomycorrhizae & endomycorrhizae.

466. Which of the following statements is incorrect about gymnosperms?
(a) Their seeds are not covered
(b) They are heterosporous
(c) Male and female gametophytes are free living
(d) Most of them have narrow leaves with thick cuticle

NEET-2020 Phase-II

Ans. (c) : Gymnosperms have naked seeds. All of them are heterosporous. Male and female gametophytes do not have independent existence hence are not free living. The male and female gametophytes of gymnosperms are highly reduced. They are dependent upon sporophytes and are not free living.

467. Zooidogamy is found in
(a) Cedrus (b) Pinus
(c) Cycas (d) Both (b) and (c)

JIPMER-2019

Ans. (c) : Zooidogamy is a type of plant reproduction in which male gametes (antherozoids) swim in a path of water to the female gametes. It is a type of reproduction which does not involve the pollen grains. This way the anther reaches the archegonium. Zooidogamy is found in algae, bryophytes, and some gymnosperm.

468. Small specialised roots called coralloid roots are associated with N_2-fixing cyanobacteria in
(a) Pinus (b) Cedrus
(c) Ginkgo (d) Cycas

TS EAMCET-08.05.2019 Shift-I

Ans. (d) : Cycas is perennial, slow growing evergreen plant and is referred as living fossil. Coralloid roots are special types of roots developed from the normal roots. These roots are negatively geotropic possess nitrogen fixing algae helping in N_2 fixation.

469. VAM is a type of
(a) Ectomycorrhiza (b) Bioinsecticide
(c) Endomycorrhiza (d) Bioherbicde

MHT CET-2019

Ans. (c) : VAM i.e., Vesicular arbuscular mycorrhiza is an endomycorrhiza. It is a type of fungi present in symbiotic relationship with roots of the plants. It directly penetrates within the cells of the plants & direct exchange of material takes place in the cell.
• Ectomycorrhiza is a form of symbiotic relationship that occurs between fungal symbiont or mycobiont and roots plants.
• Bioinsecticides are biological substances or organisms that damages, kills or repells organisms seen as pest.
• Bioherbicides are living microorganisms used for weed control.

470. Mycorrhiza is a relationship of roots of Pinus and;
(a) fungus (b) alga
(c) bacteria (d) ants

NEET-2019 / BVP-2001

Ans. (a) : Mycorrhiza is a symbiotic relationship between the roots of plant, such as pinus and fungi The term mycorrhiza refers to the role of the fungus in the plant's rhizosphere, its roots system. Mycorrhiza plays an important role in plant nutrition, soil biology & soil chemistry.

471. Which of the following statements is correct?
(a) Ovules are not enclosed by ovary wall in gymnosperms
(b) Selaginella is heterosporous, while Salvinia is homosporous
(c) Stems are usually unbranched in both Cycas and Cedrus
(d) Horsetails are gymnosperms

NEET-2018

Ans. (a) : Ovule are not enclosed by ovary wall in gymnosperms. In gymnosperm, seeds are naked, hence they do not occur inside the fruit.
The enclosed condition of their seeds contrasts with the seeds and ovules of flowering plants, which are enclosed within an ovary.

472. Gymnosperms lack
(a) herbs (b) shrubs
(c) trees (d) lianas

Uttarakhand PMT-2011
Manipal-2003

Ans. (a) : There is complete absence of herbs & climbers in gymnosperms.
• A shrub is a small to medium-sized perennial woody plant. In gymnosperm ephedra & gnetum are shrubs.
• Gymnospermic plants that are trees are- ginkgo, pinus, cedar, etc.

473. Seed of Pinus possesses:
(a) parent sporophyte as seed coat, perisperm etc.
(b) gametophyte like endosperm
(c) future saporophyte like embryo
(d) all of the above

J&K CET-2002

Ans. (d) : Seed of pinus is perisperm diploid (2n). The wing of seed is thin, membranous diploid (2n) and develops jointly from the basal upper surface (adaxial) of ovuliferous scale and outer layer of integument of the ovule. Seed shows the three generation-parent sporophyte, gametophyte & future sporophyte. Seed is a matured ovule. The matured ovule consists of a seed coat, megagametophyte & embryo.

474. Largest ovule in plant kingdom are found in
(a) Pinus (b) Cycas
(c) Thuja (d) Gnetum

BHU PMT (Mains)-2010
AIPMT-1998

Ans. (b) : The ovule is the structure in a plant that develop into a seed. Largest ovule in plant kingdom is found in cycas. Female cone consists of megasporophylls. Each megasporophyll bears 2-12 reddish ovules in the middle fertile part. Ovules of cycas are 6-7 cm. in diameter and it is considered as largest ovule.
• Pinus is genus belonging to the family pinaceae. They are generally conifer tree or shrubs.

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475. Mycorrhiza exhibits the phenomenon of :
(a) antagonism (b) endemism
(c) parasitism (d) symbiosis

BVP-2002

Ans. (d) : The mycorrhiza is a symbiotic relationship that exhibits the phenomenon of mutualism or symbiosis. Symbiosis is a relationship or interaction between two or more species that share a common habitat.

476. Conifers are adapted to tolerate extreme environmental conditions because of
(a) broad hardy leaves
(b) superficial stomata
(c) thick cuticle
(d) the presence of vessels

NEET-2016 Phase-II

Ans. (c) : Conifers (Gymnosperms) are adapted to tolerate extreme environmental condition because of thick cuticle, sunken stomata and needle like leaves.
Thus, these leaves are well adapted to withstand the harsh and cold climate. They have sunken stomata to preserve water loss during physiological drought conditions.

477. In which of the following gametophyte is not independent free living?
(a) Marchantia (b) Pteris
(c) Pinus (d) Funaria

AIPMT-2015

Ans. (c) : The existence of male and female gametophytes is not independent and free-living in gymnosperms (pinus). They remains within the sporangia retained on the sporophytes. The pollen grain is released from the microsporangium. They are carried in air currents and come in contact with the opening of the ovules born on megasporophylls. The pollen tube carrying the male gametes grows towards archegonia in the ovules and discharge their contents near the mouth of the archegonia.

478. Top-shaped multiciliate male gametes and the mature seed which bears only one embryo with two cotyledons, are characteristic features of –
(a) Gamopetalous angiosperms
(b) Conifers
(c) Polypetalous angiosperms
(d) Cycas

AIPMT-2005

Ans. (d) : Cycas is an evergreen palm like plant. It belongs to order cycadales of gymnosperm, having largest top shaped multiciliate male gamete.
- Conifers have sperm that do not have flagella, but instead are conveyed to the egg via a pollen tube.
- It is important to note that the seeds of gymnosperm are not enclosed in their final state upon the cone.

479. In Pinus/gymnosperms, the haploid structure are
(a) megaspore, endosperm and embryo
(b) megaspore, pollen grain and endosperm
(c) megaspore, integument and root
(d) pollen grain, leaf and root

AIPMT-1989

Ans. (b) : Endosperms is produced before fertilization and hence it is haploid. The structure that are haploid in pinus are megaspore pollen grain and endosperm.

480. In Pinus, the pollen grain has 6 chromosomes then in its endosperm will have
(a) 12 (b) 18
(c) 6 (d) 24

AIPMT-1992

Ans. (c) : In pinus, if the pollen grain has 6 chromosome then its endosperm will also have 6 chromosome as endosperm and pollen grains are haploid structure. The gymnosperm pollen grain consist of four cell the tube cell the generative cells and two prothallial cell.

481. Though Cycas has 2 cotyledons, this is not included in dicot because
(a) naked ovule
(b) they have megaspore
(c) appears as palm tree
(d) has compound leaves

JIPMER-2005 / Haryana PMT-2005
BHU PMT-2003

Ans. (a) : Though cycas has 2 cotyledons but is not included in dicot because it has naked ovule. As cycas are not covered by ovary, so, they do not bear fruits. It produces largest ovules. The ovules are orthotropous and unitegmic.

482. In which of the following groups are seeds presents?
(a) Psilophyta (b) Ginkgopsida
(c) Lycopodiophyta (d) Bryophyta

AIIMS-2011

Ans. (b) : Ginkgopsida belongs to gymnosperms. In the gymnosperms seeds are formed but pteridophytes have sporophytic plants body, no seed formation.
- The pteridophytes are classified into four classes: Psilopsida (Psilotum), Lycopsida (Selaginella, Lycopodium), Sphenopsida (Equisetum) and pteropsida (Dryopteris, Pteris, Adiantum).
- Bryophyta includes embryophytes like mosses, hornworts and liver worts.

483. Select one of the following pairs of important features distinguishing Gnetum is from Cycas and Pinus and showing affinities with angiosperms.
(a) Perianth and two integuments.
(b) Embryo development and apical meristem.
(c) Absence of resin duct and leaf venation.
(d) Presence of vessel elements and absence of archegonia

AIIMS-2008

Ans. (d) : Gnetum is a genus of gymnosperms, the sole genus in the family Gnetaceae and order Gnetales.
- They are tropical ever green trees, shrubs and lianas, unlike other gymnosperms they possess vessel elements in the xylem.
- Gnetum has no archegonia, some free nuclei present as eggs but vessles are present. The female gametophyte initially is partially developed and developed fully after fertilization.
- The presence of short apices is the characteristic of Gnetum which is also found is angiosperms.
- The ovules of the Gnetum are also enclosed.

484. Cycas is classified as a gymnosperms due to its
(a) Motile sperms (b) Fruit formation
(c) Naked ovule (d) Phycnoxylic wood

AIIMS-2014

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Ans. (c) : Cycas is classified as a gymnosperms. In this plant ovules are not enclosed by any ovary wall (naked ovule) and remain exposed, both before and after fertilization.

- Most of the seed plants have pollen, which contain and transports the sperm to fertilize the egg.
- As pollen is resistant to desiccation, the sperm can be transported between plants across large distances without drying up.
- The gymnosperms (naked seed plants) consists of four phyla: conifers, cycads, gingkoes and gnetophytes.
  Cycads produce pollen, but the sperm still swims down the pollen tube using flagella. As it also has a naked seed, it is classified as gymnosperm.

485. Megasporophyll of *Cycas* has the same nature as

(a) Stamen (b) Petal
(c) Sepal (d) Carpel.

AIIMS-2002

Ans. (d) : Megasporophyll of cycas is equivalent to carpel. In cycas megasporophyll are borne on female plant and they produce ovule. Carpel is also a female reproductive organ of flowering plant.

486. Sperm of Cycas is:

(a) multiflagellated and very large
(b) small and biflagellated
(c) multiflagellated and small
(d) large and biflagellated

JCECE-2006

Ans. (a) : Cycas has dominant diploid sporophyte phase in its life cycle. The male gametes (spermatozoids) of cycas & ginkgo are unique among all seeds plants. It is multiflagellate and very large. In cycas revoluta the size of the sperm ranges between 180-210 μm and clearly visible to the naked eye.

487. In Cycas, diploxylic condition is found in–

(a) stem (b) root
(c) coralloid root (d) leaflet

Uttarakhand PMT-2010

Ans. (d) : Leaflet of Cycas is diploxylic i.e., two type of xylem are present such as centripetal xylem which is exarch and centrifugal xylem which is endarch.

488. The gymnospermic endosperm differs from an angiospermic endosperm because in gymnosperms it is

(a) Haploid and developed from female gametophyte
(b) Diploid and developed from female gametophyte
(c) Triploid and developed after fertilization
(d) Triploid and developed before fertilization

MHT CET-2015

Ans. (a) : Gymnospermic endosperm differs from angiospermic endosperm because the endosperm in gymnosperm is haploid and developed from female gametophyte but in angiosperms it is post fertilization tissue and is generally triploid in nature.

489. Seeds of Pinus have:

(a) two cotyledons (b) three cotyledons
(c) many cotyledons (d) one cotyledons

JIPMER-1996

Ans. (c) : Pinus is Gymnospermic plant. It is include medium sized tree or tall tree and shrub. The mature seeds of Pinus is composed of hard testa, thin tegmen, endosperm, embryo and caplike perisperm. The embryo indudes a short-axis bearing ten cotyledons. Thus, Pinus has many cotyledons.

490. In Pinus, male and female reproductive structures occur?

(a) On different branches of the same plant
(b) On different plants
(c) On same branch
(d) None of the above

CG PMT-2005

Ans. (a) : Pinus is a monoecious plant with male & female cones on the same tree. But the male and female reproductive structures occurs on various branches of the same plant. The female cones are typically larger on a pinus tree. They are situated at the top of the tree branches. The male cone on the lower branches are smaller in size.

491. Transfusion tissue for lateral conduction of water and food are found in

(a) roots of gymnosperms
(b) stem of gymnosperms
(c) leaves of gymnosperms
(d) leaves of angiosperms
(e) None of the above

CMC Vellore-2015

Ans. (c) : Transfusion tissue or hydrostereom for conduction of water and food are found in leaves or leaflets of pinus and cycas. It is the tissue that is found characteristically around the vascular bundles of gymnosperm leaves consisting of parenchyma, lignified and non-lignified tracheids with bordered pits.

- The root system present in the gymnosperm is the taproot system. In some plants coralloid roots are found.
- The stem of gymnosperms can be branched or unbranched
- Angiosperm leaves typically have a blade or lamina, a flattened part with high chloroplast concentration.

492. Inverted omega-shaped vascular bundles are found in

(a) rachis of Cycas (b) leaflet of Cycas
(c) roots of Cycas (d) old stew of Cycas
(e) None of the above

CMC Vellore-2015

Ans. (a) : Inverted omega shaped vascular bundles are found in rachis of cycas. The rachis is mostly found in compounds leaves where many leaves are attached to this single large structures which forms the main axis for the joining of leaves.

- In cycas leaflet, vascular bundle are conjoint, collateral and open.
- In young roots, the arrangement of vascular bundles in radial which means xylem and phloem are present on different radii.
- In stems of cycas the vascular bundles are arranged in the form of rings in the stem.

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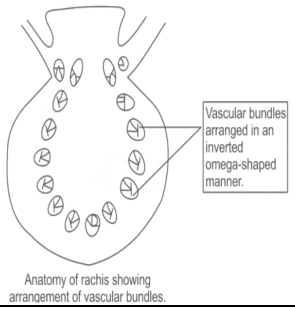

Anatomy of rachis showing arrangement of vascular bundles.

493. Wood of Cycas is:
(a) pycnoxylic only
(b) polyxylic only
(c) manoxylic and polyxylic
(d) none of the above

Punjab MET-2006
DUMET-2004

Ans. (c) : Secondary wood in cycas is manoxylic wood. It is a non-compact wood with large amount of parenchyma large pith and cortex mixed with xylem tracheids. It lacks vessels and is not used commercially as it is not durable.

• Pycnoxylic wood is a compact strong wood with large no. of xylem tracheids or wood and a small amount of cortex and pith with little parenchyma.

• Polyxylic wood is a dense wood with a high amount of secondary xylem.

494. Which of the following gymnosperm has the presence of vessel?
(a) Pinus (b) Ephedra
(c) Cycas (d) None of these

DUMET-2004

Ans. (b) : Ephedra belongs to gnetophyta which are the only gymnosperm, which possesses vessels or xylem vessels. Xylem vessels are the long tube like compositions which assist in the conduction of water. Ephedra is low climbing desert shrubs. The stems are green and photosynthetic leaves are opposite or whorled. The plants are mostly dioecious.

495. Cycas circinalis is a source of:
(a) Resin (b) Timber
(c) Essential oil (d) Starch

DUMET-2003

Ans. (d) : Cycas circinalis is an evergreen shrub growing upto 3.5 m at a slow rate. It is a gymnosperm. The pith is rich in carbohydrate and a sago i.e., starch can be made from it. It is also known as queen sago. The seeds of cycas circinalis is poisonous.

Resin:- Resin is a natural or synthetic compound consisting of a non-crystalline or viscous liquid substance.

Timber:- Timber refers to wood used for building materials. Timber can also be referred as wood at different stages of processing.

• An essential oil is a concentrated hydrophobic liquid containing volatile chemical compounds from plants.

496. Which of the following statement is correct regarding Cycas?
(a) Single sporophyll bears male and female sex organs
(b) Single cone bears male and female sporophylls
(c) Male and female sex organs are present on same plant
(d) Male cone and megasporophylls occur on separate plants

Manipal-2001

Ans. (d) : Cycas belongs to the order cycadales of Gymnosperms, having male cone and megasporophylls on separate plants. Cycas is dioecious i.e., male cone and female cone are borne on separate plants. Each microsporophyll of male cone bears many microsporangia in its adaxial surface. The female cone has loosely arranged megasporophylls which bears ovule in the middle part.

497. In Pinus :
(a) seed is winged but-pollen grains are not
(b) both seed and pollen grains are wingless
(c) pollen grains are winged but seed is not
(d) both seeds and pollen grains are winged

J&K CET-2001

Ans. (d) : In pinus both seeds and pollen grains are winged. In pinus, some of the surface tissue of the ovuliferous scale remains attached to the seed, forming a membranous wing. Winged seeds are believed to promote the long-distance dispersal through air. The pollen are designed to enable the grains to travel long distance in the air.

498. Which of the following characteristics does not occur in Pinus?
(a) The number of needles in a spur of Pinus roxburghii is three
(b) Each vascular bundle in the long shoot of Pinus consists of xylem facing towards the centre of the shoot
(c) Microsporophyll of Pinus bears two microsporangia
(d) Pinus is a homosporous gymnosperm

J&K CET-2003

Ans. (d) : Pinus is a heterosporous gymnosperm and not homosporous. Heterosporous refers to the presence of the types of spores on the same plant. Megaspore and microspore on the other hand homospore generates identical cells.

• Vascular bundles in pinus is collateral, endarch and open.

499. Which one of the following is a gymnosperm
(a) Mango (b) Walnut
(c) Funaria (d) Chilgoza

Rajasthan PMT-2003

Ans. (d) : Chilgoza or pinus gerardiana is a tall tree belonging to division gymnosperm. It is a tall tree with usually deep, wide and open crowns, with long, erect branches. The leaves are needle like, in groups, of three and spread stiffly. The seeds are broads, with a thin shell and a rudimentary wing.

500. Megasporophyll of Cycas is equivalent to
(a) stamen (b) sepal
(c) petal (d) carpel

Rajasthan PMT-2003

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Ans. (d) : Megasporophyll is gynoecium. Megasporophyll has an ovary, stigma, and style. Ovules in gymnosperms are not contained in an ovary; instead, they are exposed on megasporophyll, which resemble large leaves.
Carpeles are thought to be phylogenetically derived from ovule- bearing leaves or leaf homologous (megasporophylls), which evolved to form a closed structure containing the ovules.

501. Cycas contains
(a) resin canal
(b) mucilagenous canal
(c) lactiferous canal
(d) none of the above

Rajasthan PMT-2001

Ans. (b) : The plant genus cycas is a member of the cycadaceae family. The body of these plants is divided into roots, stems and leaves. The pith is situated in the centre of the stem and shows the presence of irregularly scattered mucilage ducts. The mucilage is made of monosaccharides.

502. Mycorrhiza is found in
(a) oligotrophic soil (b) eutrophic soil
(c) both [a] and [b] (d) none of the above

DUMET-2007

Ans. (a) : In oligotrophic soil the availability of nutrient is very low. This type of soil found in tropical forest. A major adaptation of tropical plants is present of mycorrhizae.

503. Conifers differ from grasses in the
(a) production of seeds from ovules
(b) lack of xylem tracheids
(c) absence of pollen tubes
(d) formation of endosperm before fertilization

JCECE-2013

Ans. (d) : In the development of endosperm before to fertilization, conifers vary from grasses of all the seed plants, conifers are most rudimentary. A seed is made up of 2 parts: an endosperm that feeds the embryo and the embryo itself, which also receives nutrition from the endosperm.
In gymnosperms, the endosperm grows from a spore. Pollination may occur when cone is small, but the endosperm continuous to grow to completion before fertilization occurs. When fully grown the endosperm develops archegonia in which single large nuclei acts as egg cell.

504. Which one of the following gymnosperms shows the complete absence of archegonia in this ovules?
(a) Cycas (b) Ephedra
(c) Gnetum (d) Ginfego

BVP-2006

Ans. (c) : Gnetum belongs to the order gnetales of gymnosperms. They have vessel elements in the xylem. The leaves of the Gnetum shows reticulate venation which is the character found in the angiosperms. Gnetum has no archagonia.

505. If Gnetum is not a flowering plant, it may be mistaken for a:
(a) tree fem (b) monocot plant
(c) dicot plant (d) none of these

BVP-2006

Ans. (c) : Gnetum is easily mistaken for a dicot plant unless it is in flowering or fruiting stage. The plant body is differentiated into roots, stem and leaves. Gnetum resembles very much in its characteristics to an angiosperm than a gymnosperm.
- **Tree ferns** are a large group of ferns with tree-like forms.
- **Monocots** are grasses & grass like flowering plants, the seeds of which typically contain only one embryonic leaf or cotyledon.

506. Coralloid root is the feature of:
(a) Cycas (b) Mosses
(c) Pinus (d) Selaginella

BHU PMT (Screening)-2005

Ans. (a) : Corolloid roots are specialized roots present in cycas. They are associated with nitrogen-fixing cyanobacteria. These roots are produced in clusters at the base of the stem and protrudes out over the ground.

507. Pollen tube of Cycas acts (1) as an agent for carrying male gamete to the egg (2) as a haustorium (3) as endosperm (4) as female cone
(a) 1,2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (b) : The Pollen tube of cycas acts as a haustorium as it absorbs food materials from the nucleus and also acts as a sperm carrier. A Pollen tube is a tubular structure produced by the male gametophyte of seed plants when it germinates. Pollen tubes were first discovered by Geovanni Battista Amici in the 19th century.

508. Very delayed fertilization occurs in
(a) angiosperms (b) cycas and pinus
(c) spermatophytes (d) All of these

BVP-2011

Ans. (b) : Cycas & Pinus are example of gymnosperms, which are group of seed-bearing plants that do not produce flowers. Gymnosperms typically have reproductive structures called cones. In case of cycads, Male cones produce pollen and female cones produce ovules. In gymnosperms, including cycads and Pinus, fertilization is considered to be "very delayed" because there is a significant time gap between the pollination and fertilization process.

509. In gymnosperms, the pollen chamber represents
(a) a cell in the pollen grain in which the sperms are formed
(b) a cavity in the ovule in which pollen grains are stored after pollination
(c) an opening in the megagametophyte through which the pollen tube approaches the egg
(d) the microsporangium in which pollen grains develop

JIPMER-2011

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Ans. (b) : In gymnospermes, the pollen chamber is cavity in the ovule in which pollen grains are stored after pollination within the pollen chamber. Pollen grain is first cell of gametophyte. Each pollen grain device asymmetrically into 2 cells - smaller prothallial cell and larger anthridial cell. Prothallial cell do not divide further. Anthridial cell divide to form generative cell and tube cell.

510. Sago which we use as food comes from this plant

(a) Calamus rotang (b) Metroxylon rumphii
(c) Areca catechu (d) Phoenix dactylifera

Punjab MET-2011

Ans. (b) : Sago is mainly extracted from *Metroxylon rumphii* which is also called sago palm. Sago is a starch extracted from the pith or spongy core tissue of various tropical palm stems. It is a major staple food for the lowland people of New Guinea & the Maluku island.

511. Which one is the hardest wood ?

(a) *Shorea robusta* (b) *Tectona grandis*
(c) *Cedrus deodara* (d) *Dalbergia sissoo*

Punjab MET-2011

Ans. (a) : *Shorea robusta* also called "Sal" is one of the most important sources of hardwood timber in India, with hard, coarse-grained wood that is light in colour when freshly cut & becoming dark brown with exposure. Sal trees are found in Burma, Assam, Bengal, Nepal, the Deccan plateau and foothills of Shivalik.

512. Which of the following is/are grouped under phanerogams?

(a) Angiosperms (b) Gymnosperms
(c) Pteridophytes (d) Both (a) and (b)

Rajasthan PMT-2008
BHU-PMT (Screening)-2008

Ans. (d) : Gymnosperms and angiosperms are the two types of phanerogams, depending on whether the seeds are enclosed in a fruit or not. Phanerogams are vascular plants with separate leaf, stem and root systems. These plants have well differentiated reproductive tissues.

- A pteridophyte is a vascular plant that disperses spores. They are sometimes referred to as "cryptogams" because they produce neither flowers nor seeds.

513. Water is not necessary for the fertilization of :

(a) algae (b) bryophyta
(c) Cycas (d) none of these

MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (c) : Cycas is a gymnospermic plant. Gymnosperms don't require water for fertilization because these are terrestrial plants. The movement of pollen grains from male reproductive part to the female reproductive part (ovules) mainly occurs by the air or with the help of biotic pollinators.

514. The coralloid root of Cycas has Anabaena (BGA), this type of association is called

(a) commensalism (b) parasitic
(c) symbiotic (d) antibiosis

UP CPMT-2012

Ans. (c) : The coralloid roots of Cycas has Anabaena, this type of association is called symbiotic relationship. In symbiosis, both the organisms in association is obligatory. The blue-green algae Anabaena reside in coralloid roots of Cycas for nitrogen fixation.

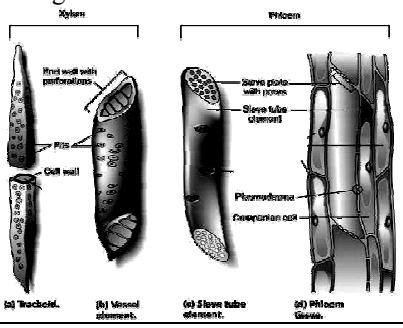
515. The chief water conducting elements of xylem in gymnosperms are :

(a) Vessels (b) Fibres
(c) Transfusion (d) Tracheids

AIPMT (Screening)-2010

Ans. (d) : In Gymnosperm water conduction occurs mainly through tracheids.

- Gymnosperm is non flowering seed bearing plants. Vascular bundles are present in the gymnosperms but vessels are absent in the xylem and the phloem lacks the companion cell. Thus water conduction occurs mainly through tracheids.



516. Which one of the following plants is monoecious?

(a) Papaya (b) Marchantia
(c) Pinus (d) Cycas

AIPMT (Mains)-2010 / AIPMT-2009

Ans. (c) : The term monoecious refers to plants that bears unisexual reproductive organs on the same plant. This feature can be found in Pinus. Plants that have reproductive organs, both female and male, or flowers called monoecious plants. These male and female sections are situated at various plant location.

517. In which one of the following, the male and female gametophytes don't have free-living independent existence?

(a) Pteris (b) Funaria
(c) Polytrichum (d) Cedrus

JIPMER-2012
AIPMT-2008

Ans. (d) : Cedrus belongs to the phylum gymnosperm. In this plant male and female gametophyte do not have an independent free living existence. Male gametophyte remain inside the microsporangium and female gametophyte remain inside the mega sporangium

518. Plant group with largest ovule, largest tree and largest gametes:

(a) Gymnosperm (b) Angiosperm
(c) Bryophyta (d) Pteridophyta

AIPMT-2000

Ans. (a) : Gymnosperms is that plant group which is characterized by naked seed bearing vascular plants. In this group Cycas have largest ovule and largest antherozoite. Sequoia is the largest plant of plant kingdom which belongs to Gymnosperms

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519. Gymnosperms are also called soft wood spermatophytes because they lack:
(a) Thick-walled tracheids
(b) Xylem fibres
(c) Cambium
(d) Phloem fibres

AIPMT (Screening)-2012

Ans. (b) : Gymnosperm are also called softwood spermatophytes because they lack Xylem fiber and thick walled tracheids. In Gymnosperm large amount of parenchymatous cells are present with secondary xylem tracheids.

520. Cycas and Adiatum resemble each other in having:-
(a) Cambium (b) Vessels
(c) Seeds (d) Motile sperms

AIPMT (Screening)-2012

Ans. (d) : Cycas and Adiatum both a have muticilliated motile sperm.
- Adiatum also known as walking fern or maiden hair fern is a pteridophyte resembles with cycas.
- Nacked seed, cambium is usual in gymnosperms and lack in pteridophyte
- True vessels are lacking in both gymnosperm and pteridophytes. Adiatum known as a single hair fern
- Cycas plants are dioecious belong from family cycadaceae.

521. What is common in all the three, *Funaria, Dryopteris* and *Gingko?*
(a) Independent sporophyte
(b) Presence of archegonia
(c) Well developed vascular tissues
(d) Independent gametophyte

NEET (Karnataka)-2013

Ans. (b) : In Funaria, Dryopteris and Gingko all have the presence of archegonia i.e. female sex organ is common, and differences are seen in Dryopteris which lacks vascular bundle and have independent sporophyte while Gingko have independent gametophyte.

522. Which statement is wrong for *Cycas* :
(a) Xylem have vessels
(b) Female flowers well developed
(c) It has coralloid roots
(d) Circinate ptyxis

AIPMT-1998

Ans. (a) : Cycas belongs to the family cycadaceae like other gymnosperms, have xylem and phloem along with true leaves, stem and roots. The vessels are absent in the xylem tissue of cycas. So, xylem have vessels is a wrong statement for cycas.

523. Cycas have two cotyledons but not included in angiosperms becuase of : -
(a) Naked ovules (b) Seems like monocot
(c) Circinate ptyxis (d) Compound leaves

AIPMT-2001

Ans. (a) : Cycas possesses naked seed (i.e. seed is not enclosed inside fruit). Cycas belongs to the order cycadaly of gymnosperm. In cyas there is no double fertilization, so the endosperm produced is haploid rather than triploid. So, it is not included in angiosperms as they have ovules (or seeds) produced 46 inside fruit. This is the main difference between gymnosperms and angiosperm.

524. The gametophyte is not an independent, free living generation in :
(a) Pinus (b) Polytrichum
(c) Adiantum (d) Marchantia

AIPMT (Screening)-2011

Ans. (a) : In Gymnosperms (like pinus), the main plant body is sporophyte. Sporophytic generation (diploid) is dominant & independent. It greatly exceeds the reduced and dependent gametophyte generation (haploid).
- Pinus have needle - shaped leaf that remain on the trees throughout the whole year (evergreen plants). Pinus is a monoecious plant, which means that one plant produces individual male and female cones.

Note:-
- Adiantum belong to the group ferns
- Marchantia is a member of the group liverworts.
- Polytrichum is a member of the group moss.

525. A prokaryotic autotrophic nitrogen fixing symbiont is found in
(a) Pisum (b) Alnus
(c) Cycas (d) Cicer

AIPMT (Screening)-2011

Ans. (c) : Symbiont means two organism living together. In case of cycas plant have a special type of root known as coralloid root.
• Coralloid roots are formed soon after the primary root. Function of this root is N_2 fixation because of presence of cyanobacteria (a member of blue green algae).

526. False statement related to Cycas is
(a) Motile male gametes and pollen tubes are involved in fertilization
(b) Endosperm formation occurs before fertilization
(c) Ovule contains pollen chamber.
(d) Gametophytic tissue is not found in seeds

AP EAMCET-2010

Ans. (d) : Gametophytic tissue (endosperms) is found in Cycas Seed.
Cycas are dioecious plants with separate male and female plant and fertilization is effected by motile male gametes so called **Zooidogamous reproduction**.
The endosperm in cycas is a haploid gametophytic tissue formed before fertilization. Cycas ovule contains pollen chamber in which pollen grains are stored after pollination.

527. Read the following lists

List-I		List-II	
A.	Exarch	1.	Rhizome of Pteris
B.	Endarch	2.	Roots of Pteris
C.	Mesarch	3.	Pinnule of Cycas
D.	Pseudomesarch	4.	Primary stem of Pteris

The correct match is

	A	B	C	D
(a)	1	3	4	2
(b)	2	4	3	1
(c)	2	4	1	3
(d)	3	2	1	4

AP EAMCET-2008

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Ans. (c) :
• Stele present in roots of pteris is protostele with diarch and exarch xylem.
• Primary stem of pteris contain endarch xylem.
• Mesarch type of xylem is found in rhizome of pteris (in ferns).
• Pseudomesarch is found in primary stem of pteris.

528. Choose the correct statement:
(a) Apophysis is the basal fertile part of the capsule in Funaria.
(b) Apophysis is the apical sterile part of the microsporophyll in Cycas.
(c) Apospory is the development of sporophyte from vegetative cells of the gametophyte.
(d) Apogamy is the development of gametrophyte from the vegetative cells of the sporophyte.

AP EAMCET-2005

Ans. (b) : Apophysis is the apical sterile portion of the microsporophyll in Cycas. Apospory is the formation of gametophyte directly from sporophyte. Apogamy is the formation of sporophyte directly from gametophyte.
Apophysis present in the microsporophyll of cycas. It is a wedge-shaped and dorsoventrally flattened structure. The basal part of the apophysis is sterile. The middle part is fertile and the apical part is a sterile region. The terminal part which has an expanded sterile tapering portion is called the **apophysis**.

529. Select one of the following pairs of important features distinguishing *Gnetum* from *Cycas* and *Pinus* and showing affinities with angiosperms:
(a) perianth and two integuments
(b) embryo development and apical meristem
(c) absensce of resin duct and leaf venation
(d) presence of vessel elements and absence of archegonia

AIPMT-2008

Ans. (d) : Gymnosperms are seed plants that do not produce flowers. Cycas, Pinus and Gnetum all belong to his group of plants, Gnetum with its 30 species belong to a very dissimilar genera of the family Gnetales. The important features distinguishing Gnetum from cycas and pinus and showing affinities with angiosperms are the presence of vessel elements and absence of archegonia.

530. In gymnosperms, the pollen chamber represents:
(a) The microsporangium in which pollen grains develop
(b) A cell in the pollen grain in which the sperms are formed
(c) A cavity in the ovule in which pollen grains are stored after pollination
(d) An opening in the megagametophyte through which the pollen tube approaches the egg

AIPMT-2007

Ans. (c) : The pollen chamber in gymnosperm is a cavity in the ovule in which pollen grains are deposited after pollination. The generative cell nucleus splits into 2 gametic nuclei inside the pollen chamber, and the cell lengthens to form the pollen tube.

531. In Cycas, pollination takes place in
(a) 3 celled stage (b) 4 celled stage
(c) 2 celled stage (d) 1 celled stage

JIPMER-2009

Ans. (a) : In cycas, pollination takes place in 3 celled stage. The pollination drop is dehydrated and the pollen grains are sucked in to the pollen chamber. The producing cell nucleus separates into two gametic nuclei within the pollen chamber and the tube cell becomes elongated to produce the pollen tube. The gametic nuclei can pass via the female gametophyte's is pollen tube. A zygote is formed when one unites with the female gamete.

532. Which economically important product is obtained from Cycas circinalis?
(a) Timber (b) Sago
(c) Essential oil (d) Resin

UP CPMT-2005

Ans. (b): Cycas cricinalis, commonly known as the Queen sago palm or Queen cycad, is a species of cycad native to India, Sir Lanka and several other countries in Southeast Asia. Sago is made from the pitch of cycas circinalis.

533. What is the ratio of mitotic divisions that take place in the microspore of Cycas before and after liberation from the microsporangium during the development of male gametophyte?
(a) 1 : 2 (b) 2 : 1
(c) 3 : 2 (d) 1 : 1

AP EAMCET-2013

Ans. (d): The ratio of mitotic division is 1:1 that take place in the microspore of Cycas before and after liberation from the microsporangium during the development of male gametophyte. After pollination the microspore or pollen grain produces stalk cell and body cell. The body cell then undergoes mitotic division to produce sperm in the ratio of 1:1.

534. The secondary xylem of Cycas is
(a) Manoxylic
(b) Manoxylic with large amount of parenchymatous cells
(c) Pycnoxylic and monoxylic
(d) Pycnoxylic with bordered pits

UP CPMT-2014

Ans. (b): The secondary xylem is also called as wood. It is manoxylic with large amount of parenchyma ions cells in Cycas. Wood of pinus is Pycnoxylic and used in furniture.

535. A gymnosperm, popularly known as sagopalm, possess two cotyledons, but is not classified as dicotyledons why?
(a) Due to production of largest multiciliate. mononucleate sperm
(b) Pollination takes place by wind
(c) Pollen grain are shed at 3-celled stage
(d) Due to open and exposed ovules on megasporophyll

UP CPMT-2014

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Ans. (d): Cycas is popularly known as sagopalm, and possess two cotyledons. It is member of order cycadales of division gymnosperm.

- The later are characterized by presence of exposed ovules an megasponphyll, i.e., naked seed, therefore, Cycas is not include in dicotyledons.

536. The type of pollination in Cycas is

(a) entomophily (b) hydrophily
(c) anemophily (d) malacophily

UP CPMT-2011
VMMC-2010

Ans. (c): In cycas, the 3-celled microspore is shed off in the air after the dehiscence of the sporangium. They are very light-weight and are carried by air current (anemophily).

Entomophily- Entomophily or insect pollination is a form of pollination where by pollen of plant especially but not only of flowering plant is distributed by insect.

Hydrophily- Pollination of flowering plant by water is known as **hydrophiliy. E.g. - Valisenaria and zoostera**.

Malacophily- Pollination of flower by slugs and snails is called **malacophily. E.g. - Lemna**.

537. Match items in column-I with those in column-II

Column-I	Column-II
A. Peritrichous flagellation	1. Ginkgo
B. Living Fossil	2. Macrocystes
C. Rhizophore	3. Escherichia coli
D. Smallest flowering plant	4. Selaginella
E. Largest perennial alga	5. Wolffia

Select the correct answer from the following

	A	B	C	D	E
(a)	2	1	3	4	5
(b)	5	3	2	5	1
(c)	1	2	5	3	2
(d)	3	1	4	5	2

VMMC-2011
JIPMER-2007

Ans. (d) :

A. Peritrichous flagellation	3. Escherichia coli
B. Living fossil	1. Ginkgo
C. Rhizophore	4. Selaginella
D. Smallest flowering plant	5. Wolffia
E. Largest perennial alga	2. Macrocystes

538. Which of the following two characters are shared by Cycas and Pteris? Choose correct option from codes given below.

I. Formation of motile gametes.
II. Formation of haploid endosperm.
III. Formation of sporophyte directly from gametophyte without gametic union.
IV. Formation of archegonia in female gametophyte.

(a) I and IV (b) I and III
(c) II and IV (d) III and IV

BVP-2013

Ans. (a) : In cycas and pteris which belong to Gymnosperm and pteridophytes, the sperms are multiflagellate in nature, hence the male gametes are motile in nature and the female gametophyte contains archegonium.

539. Both heterospory and circinate ptyxis occur in

(a) Dryopteris (b) Pinus
(c) Cycas (d) Funaria

Punjab MET-2009
Rajasthan PMT-2009
Manipal-2003

Ans. (c) : Cycas and Pinus both are heterosporous plants because they produce two types of spores megaspores and microspores. But, circinate ptyxis is present in Cycas only. In circinate ptyxis, the leaf in a young stage coils in a special manner.

540. Number of archegonia in Cycas is

(a) 8 (b) 4
(c) 1 (d) 2

JCECE-2008
UP CPMT-2007

Ans. (b) : In Cycas, the archegonia are formed from the gametophytic cells lining the archegonial chamber. The number of archegonia formed in a gametophyte is variable, e.g, 3-8 in Cycas revoluta, 3-6 in Cycas rumphi and 3-8 in Cycas circinalis.

541. Pinus seed is originated in :

(a) capsule (b) microsporophyll
(c) microsporangia (d) megasporophyll

MGIMS Wardha-2003

Ans. (d) : Mesasporophylls present in the middle of the strobilus are very large and they decrease in size towards the base and apes. The seed is the result of fertilization and consequent of enlargement of the ovule. Two ovule or megasporangium are present on the adaxial side of ovuliferous scale. The scales and bracts constitute the megasporophyll. There are about 80-90 megasporophylls in a single female cone of Pinus.

542. In Cycas coralloid roots has

(a) Clostridium (b) Rhizobium
(c) Mycorrhiza (d) Anabaena

Punjab MET-1999

Ans. (d) : The symbiotic association exists between coralloid roots of cycas and cells of Anabaena (a blue-green alga). These coralloid roots are produced in the cluster at the base of the stem which because of its apogeotropic growth produce out over the ground. It is dichotomously branched and is in symbiosis with Anabaena allowing nitrogen fixation.

543. No vessels are found in the wood of

(a) Pine (b) Eucalyptus
(c) Teak (d) Shesham

AMU-2015

Ans. (a) : Vessel form the primary component of xylem and they are dead cell at maturity. The secondary xylem without vessels is called non-porous wood. It is found in the wood of gymnosperms. For example, Pine in which no vessels are found in the wood.

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544. Mycorrhizal association is must for growth of
(a) Mushrooms (b) Orchids
(c) Sal and teak (d) None of these
BCECE-2011

Ans. (b) : Mycorrhiza is the product of a symbiotic association between fungi and plants. The seedling of orchids fail to grow longer unless they develop mycorrhizal association. Hence, orchids are usually propagated by vegetative means rather than by seeds.

545. Mycorrhiza acts as:
(a) root
(b) mechanical support
(c) root hairs with an advanced absorption capacity
(d) an organism
BHU PMT-2002

Ans. (c) : The mycorrhiza is the symbiotic relationship between plants and fungi of its host plant. A hair-like outgrowth of a plant root, which absorbs water and minerals from the soil. The root hairs are tubular extensions of the epidermis. It absorb nutrients and trans-located them back to the host plant.

546. Mycorrhiza is :
(a) association of root and bacteria
(b) association of root and fungi
(c) association of root and algae
(d) parasitic root
BHU PMT (Mains)-2005 / AMU-1998

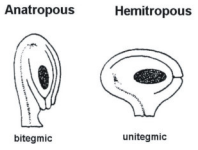
Ans. (b) : Mycorrhiza is a mutualistic interaction in which a fungus and a root involved. For eg. Boletus (fungus) and Pinus (root). The root provides food and shetter to the fungus. The fungus helps the plant in solubilization and absorption of minerals, water uptake and protection against pathogenic fungi.

547. In which of the following excurrent stem found?
(a) Cycas (b) Pinus
(c) Mango (d) Wheat
BHU PMT (Mains)-2011

Ans. (b) : An excurrent stem found in the plant Pinus. The side branch grows in an acropetal manner in which old flowers are arranged in the lower side and young flowers are at the upper side. A tree takes a pyramidal form due to development of racemose branching, it is excurrent e.g. pinus.

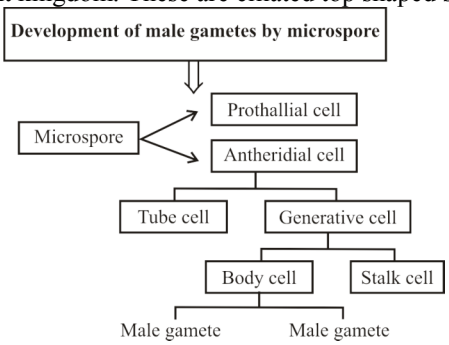
548. In gymnosperms, the ovules are
(a) Naked unitegmic
(b) covered multitegmic
(c) Bitegmic
(d) Covered unitegmic
BHU PMT (Mains)-2011

Ans. (a) : Unitegmic is the most advanced condition. It is usually seen that the less number of integuments present in the ovule, the more advanced integuments in its properties and function. An integument is a protective layer that surrounds the ovule of the plant. There are four types of integuments on the basis of the number of layers present in it. Unitgmic, Bitegmic, Tritegmic, Ategmic.



549. In Cycas male gametes are produced in the pollen tube by division of:
(a) body cell (b) stalk cell
(c) prothallial cell (d) tube cell
BHU PMT-2001

Ans. (a) : Cycas is a Gymnosperm plant. So, in Cycas male gamete is produced in the pollen tube by division of body cell. Male gametes of Cycas are the largest in plant kingdom. These are ciliated top shaped structures.



550. Which one of the following statements is false?
(a) Stomatal movement is governed by many factors including potassium
(b) All enzymes are proteins, but all proteins are not enzymes
(c) All factors which affect respiration affect photosynthesis as well, but its reverse is not true.
(d) All following plants are characterized by seed development but all seed plants are not flowering plants
JIPMER-1998

Ans. (d) : All the angiosperms are seed bearing plants. But there are also some seed bearing plants which are not angiosperms. The seed bearing plants which have a seed cover are called angiosperms and some seed bearing plants do not have a seat cover which are called gymnosperms. The plant angiosperms are enclosed inside fruits- they have non-motile gametes. These gametes have dissmilar morphological structures.

551. Resin duct of gymnospermous stem is an example of:
(a) lysigenous cavity
(b) lysogenous cavity
(c) shizogenous cavity
(d) shizolysigenous cavity
JCECE-2005 / Punjab MET-2001,2004
Manipal-2000

Ans. (c) : The Schizogenous cavities are formed by the splitting up of common walls and the separation of masses of cells from one another. The resin ducts arise as Schizogenous intercellular spaces due to the disjoining of parenchyma cells. Resin ducts ae formed due to wounding. Examples of this schizogenous cavity or ducts of asteraceae and apiaceae, secretory cavities of eucalyptus etc.

552. Which of the following features is true for Pinus?
(a) Haploid endosperm
(b) Biciliated sperms

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(c) Double fertilization
(d) Presence of antheridia

JIPMER-1997

Ans. (a) : In Pinus, endosperm is produced before ferilization and hence it is haploid. The megaspore and pollen grains are structures of male gametophytes and is also haploid. Megaspore represents the first cell of the the female gametophyte produced by reduction division from magaspore mother cell.

553. Which of the following is a characteristic feature of gymnosperms?
(a) The gymnosperms are homosporous
(b) The male and female gametophytes do not have independent free living existence
(c) The sporophyte is dependent on the gametophyte
(d) The ovules are enclosed by the ovary
(e) The pollen grain is released from the megasporangium

Kerala PMT-2015

Ans. (b) : In gymnosperms, the male and female gametophytes do not have an independent free living existence. They remain within the sporangia retained on the sporophytes i.e., female gametophyte with megasporangium and male gametophyte within microsporangium.

554. Pick out the wrong statement
(A) Apoplast is the system of adjacent cell walls that is continuous throughout the plant
(B) Endodermis is impervious to water molecules
(C) Pinus seeds germinate and establish without the presence of mycorrhizae
(a) A and B (b) B and C
(c) C only (d) B only
(e) A only

Kerala PMT-2015

Ans. (c) : The mycorrhiza is a symbiotic association of a fungus with the roots of higher plants. Some plants like Pinus have an obligate association with the mycorrhizae. The fungal filaments form a network around the young root or they penetrate the root cells. The hyphae have a very large surface area that absorb mineral ions and water from the soil from a much larger volume of soil that perphaps a root cannot do. Therefore, Pinus seeds cannot germinate and establish without the presence of mycorrhizae. The fungus provides minerals and water to the roots in turn the roots provide sugars and N-containing compound to the micorrhizae.

555. The roots of some higher plants get associated with a fungal partner. The roots provide food to the fungus while the fungus supplies water to the roots. The structure so formed is known as
(a) lichen (b) mycorrhiza
(c) anabaena (d) rhizobium

KVPY SA-2012

Ans. (b) : A mycorrhiza is a symbiotic association between roots of higher plant and a fungus. The plant makes organic molecules such as sugar by photosynthesis and supplies them to the fungus and the fungus supplies to the plant water and mineral nutrients, such as phosphorus, taken from the soil.

556. In gymnosperms, the pollen chamber represent
(a) a cell in the pollen grain in which the sperms are formed
(b) a cavity in the ovule in which pollen grain are stored after pollination
(c) an opening in the megagametophyte through which the pollen tube approaches the egg
(d) the microsporangium in which pollen grains develop

Rajasthan PMT-2010

Ans. (b) : In gymnosperms, pollen chambers are the part that is responsible for the storage of pollen grains after pollination. This is because gymnosperms do not produce fruits to cover their seeds. This is cavity at the tip of the ovule lying under the integuments. When the plant matures and these cavities swell open, releasing the pollen grains for pollination to take place. The pollen chambers present in gymnosperms represent a cavity in the ovule in which pollen grain are stored after pollination.

557. Root pressure has never been observed in
(a) Pteridophytes (b) Gymnosperms
(c) Monocotyledons (d) Dicotyledons

AMU-2011

Ans. (b) : The root pressure is the force that helps to drive fluids upward into conducting vessels i.e. xylem. Because Gymnosperms are tall plants, root pressure cannot move water up to the height of the plant. Another factor is the absence of xylem arteries in gymnosperms, which prevents root pressures. The root pressure is thus not a feasible option for tall plants like gymnosperms for the transport of fluids.

558. Ectomycorrhiza is commonly found in
(a) Pinus (b) Quercus
(c) Rhododendron (d) Both (a) and (b)

AMU -2000

Ans. (d) : Mycorrhiza is a mutually beneficial association between a fungus and the roots of higher plants. The fungus absorbs water, salts and protects the plant from soil borne pathogens. In return, it gets shelter and nourishment from the plant. It is of two type : (i) Ectomycorrhiza are very common in nature on pines, (Pinus) oaks, (Querns), beech (ii) Endomycorrihza occur in red maple.

559. A mature pollen grain of Pinus has
(a) 2 cells (b) 3 cells
(c) 4 cells (d) 5 cells

Uttarakhand PMT-2009
BVP-2009
BHU PMT (Screening)-2009

Ans. (c) : In pinus, the micropore core separates by a periclinal wall and structure a tiny prothallial cell and large central cell. the central cell removes a second prothallial cell and antheridial cell. The core of the antheridial cell partitions to frame generative cell and tube cell.
Thus, die pollen grain of Pinus is shed at four cell stage when it consists of two vegetative prothallial cells, a generative cell and a tube cell.

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560. Gymnospenn may be distinguish from angiosperm by which of the following characteristic ?
(a) Absence of true seed
(b) Absence of xerophytic nature
(c) Absence of secondary growth
(d) None of the above

Rajasthan PMT-1998

Ans. (a) : The Gymnosperms have no flowers or fruits, and have naked seeds on the surface of leaves or scales whereas the angiosperms are also known as flowering plants as they have seeds that are enclosed within an ovary. The characteristics that differentiate angiosperms from gymnosperms include flower, fruits and endosperms in the seeds.

561. Vegetative reproduction Cycas occurs by :
(a) bulbils (b) sporophylls
(c) fission (d) scale leaves

Rajasthan PMT-1998
Haryana PMT-2006

Ans. (a) : Cycas is a gymnosperm where reproduction occurs vegetatively and sexually. Vegetative reproduction occurs through bulbils. The decurrent base of the bulbil is covered with scale leaf. Those leaf bases which were extended down the stem below the insertion are said to be decurrent bases. During the favourable period or condition, they get separated from the parent plants and develop into an independent new plant. Some species of cycads are similar to palm trees, while others look like ferns at first glance.

562. What is the similarity between gymnosperms and angiosperms ?
(a) Phloem of both have companian cells
(b) Endosperm is formed before fertilization in both
(c) Origin of ovule and seed in similar in both
(d) Both have leaves, stem and roots

CG PMT-2007

Ans. (d) : The presence of stem, leaves, and roots is found in both angiosperm and gymnosperm.
- Angiosperm and gymnosperms both utilize seeds as the primary means of reproduction and both use pollen to facilitate fertilization.
- Gymnosperms and Angiosperms have a life cycle that involves the alternation of generation.
- It's both have a reduced gametophyte stage.
  Angiosperms like all vascular plant have a sporophytic-dominant life cycle, Gymnosperms also have sporophyte dominant life cycle as in other vascular plants .

563. Which is haploid in case of Cycas?
(a) Stem (b) Root
(c) Endosperm (d) All the above

Uttarakhand-2005

Ans. (c) : The lowermost functional megaspore becomes the embryo sac cell. It undergoes free nuclear divisions followed by wall formation to form the cellular endosperms, here the endosperm is formed before fertilization and is haploid.
- Endosperm is a tissue produced inside the seeds of most flowering plants around the time of fertilization.

564. The terminal sterile portion of an organ, considered to be an equivalent of angiospermous stamen in Cycas, is known as:
(a) columella (b) hapteron
(c) paraphysis (d) apophysis

AP EAMCET-2003

Ans. (d) : The sterile part of cycas is apophysis. The microsporophyll of cycas is wedge shaped dorsoventrally flattened structure with basal sterile, middle fertile and apical sterile regions.
- The terminal expanded sterile tapering portion is called as apophysis.
- Microsporophyll of cycas is equivalent to stamen of angiosperm. It bears a terminal sterile portion, known as apophysis.

565. Assertion (A) : Fertilization in Cycas is called zooidogamy.
Reason (R) : Fertilization in Cycas takes place by the formation of pollen tube.
The correct answer is:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2004

Ans. (b) : Zooidogamy is a type of plant reproduction in which male gametes (antherozoids) swim in a path of water to the female gametes (archgonium).
- Siphonogamy is a condition in plant in which pollen tubes are developed for the transfer of male cells to the eggs. Siphonogamy is formation of pollen tube. Hence, both statment are correct but (R(is the not correct explanation of (A).

566. Sago of Cycas is given to patients with stomach disorders because it is
(a) with high nutritive value
(b) tastier
(c) easily digestible with less starch
(d) cheap

Haryana PMT-2002

Ans. (c): Sago of cycas is given to patient with stomach disorder because it is easily digestible with less starch. It is in the form of granule.
- The sago obtained from Cycas revoluta is easily digestible. It is a major staple food for people from new Guinea.
  Sago is not Particularly high is nutrients but it does contain some essential vitamins and minerals . It is good source of calcium, iron, and vitamin B complex.

567. Transfusion tissue is present in the leaves of
(a) Dryopteris (b) Cycas
(c) Pinus (d) Both (b) and (c)

Haryana PMT-2007
Manipal-2005
AIPMT-1998

Ans. (d) : Transfusion tissue is present in the leaves of gymnosperms. It is composed of three kinds of cell: thick walled tracheids, parenchyma and albuminous cells.

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● The main function of transfusion tissue is beleived to be the transport of materials between the vascular bundles and the mesophyll.
The transfusion tissue's Primary job is to move substances between the mesophyll and the vascular bundle, this Performing the function of lateral veins.

568. Characters of both conifers and cycads are found in
(a) Ginkgo (b) Ephedra
(c) Cupressus (d) Tsuga
Haryana PMT-2009
CG PMT-2009

Ans. (a) : Characters of both conifers and cycads are found in Ginkgo. It shows the resemblance with both Cycadales and coniferales.
- Both have woody trunks and woody roots as well as stipulate leaf bases.
- Conifers have non-motile sperms whereas cycads have motile sperms.
Resemblances between - Ginkgo and Cycadales are well developed nucellar break and pollen chamber , houstorias nature of Pollen tube, multiflagellated Spermatozoids large egg. massive female gametophyte with well developed venter endoscopic embryo with to cotyledons, hypogeal seed germination.

569. Cork is obtained from
(a) Quercus suber (b) Pinus roxburghii
(c) Cedrus deodara (d) Mangifera indica
CG PMT-2009

Ans. (a) : The phellem layer of bark tissue is used to make cork. It is an impermeable bouyant that is largely extracted from the Southwest European and Northwest African tree species. Quercus suber for commercial use.
- The periderm layers of a Quercus suber plant are used to make cork.
- Suberin of hydrophobic substance makes up cork.
- The cork is processed to various thicknesses and sizes. The presence of air in its cells accounts for much of the cork's characteristics.

570. In gymnosperms, the seeds are naked because they lack
(a) integument (b) nucellus
(c) pericarp (d) perianth
Haryana PMT-2009
CG PMT-2009

Ans. (c) : Gymnosperms have naked seeds because in gymnosperms, ovary (pericarp) is absent.
- After fertlizaton, the ovary develops into fruit and ovary wall forms the fruit wall (pericarp).

571. In Cycas diploxylic vascular bundles are found in
(a) stem (b) root
(c) leaflet (d) rachis and leaflet
AMU-2006
AP EAMCET-2002

Ans. (d) : In cycas, rachis and leaflets have a diploxylic arrangement in vascular bundles.
- Diploxylic means an arrangement of vascular bundle, where two types of xylem are present. These are centripetal xylem and centrifugal xylem. The xylem and phloem, two types of vascular tissue, are combined to produce the vascular bundle, a transport mechanism in vascular plants.
While phloem mostly carries specific organic substances, xylem primarily carries water and a few nutrients.

572. Which of the following tissue is present in the leaves of Pinus and serve to conduct water and food ?
(a) Conducting tissue (b) Transfusion tissue
(c) Phloem (d) Xylem
JIPMER-2001

Ans. (b) : The tissue immediately surrounding at least part of the vascular bundles in the leaves of gymnosperm called transfusion tissue, Exa- Pinus.
- Transfusion tissue is a prominant feature of leaf surface protected by a thick cuticle and sometimes by an additional waxy layer.
- The main function of the transfusion tissue is believed to be transport of materials between the vascular bundle and mesophyll.
- Transfusion tissue is composed of trachieds.
- Transfusion tissue is composed of tracheids (transfusion tracheids). With conspicuos bordered pits and parenchyme cells tranfusion tracheids.

573. Cleavage polyembryony occurs in
(a) Pinus (b) Mini Cycas
(c) Cycas (d) Ephedra
BHU PMT (Mains)-2008

Ans. (a) : Presence of more than one embryo inside the seed is called polyembryony. The cleavage polyembryony commonly occurs in gymnosperms. In case of coniferous plants, all the four cells of the young embryo develop into four embryos. The three wither is off and the one completely develops– develops into a new plants. For example- pinus.
- In pinus seperation of embryonal cells is followed by the development of each of them potential embryos.

574. In Pinus, the third tier of embryonal cells from below is known as
(a) rosette tier (b) suspensor tier
(c) embryonal tier (d) free-nuclear tier
AMU-2005

Ans. (a) : The rosette cells of the rosette tier are formed in the late stages of development, when primary and secondary suspensor cells are formed.
- In pinus, the third tier of embryonal cells from below is known as rosette tier.

575. The sclerenchyma of the hypodermis in the Pinus needle helps in
(a) Increasing the absorptive surface of the cell
(b) checking transpiration
(c) mechanical support
(d) photosynthesis
VMMC-2005 / AMU-2004 / BVP-2003

Ans. (c) : Sclerenchyma provides mechanical support in the pinus needle as it has thick walls.
- Sclerenchyma tissues are permanent tissue that are long, dead, and thick cells without any intercellular spaces.

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- Their function is to provide mechanical support to the plant which is due to the absence of interrelate spaces. Sclerenchyma can either be fibres or sclereid. A thick cuticle covers the outer part of the epidermis which helps to examine the transpiration.

576. Pollen grains in Pinus are
(a) Monosaccate (b) Bisaccate
(c) Trisaccate (d) Nonsaccate
J&K CET-2007

Ans. (b) : The pollen grains in pinus are Bisaccate. In Pinus, Pollen grains is unicellular, three layered: outer exine, the middle exointine and innermost intine.
- In some cases pollen grains of Pinus are bisaccate i.e. have two sacs (air sacs) within the wings like structure that are responsible for their bouyancy.

577. Coralloid roots in Cycas have a symbiotic blue green alga that forms an algal zone in such roots. This alga is
(a) Aulosira (b) Anabaena
(c) Oscillatoria (d) Chlorella
CG PMT-2011
Punjab MET-2011

Ans. (b) : Cyanobacteria live in symbiosis, only few species and one of the species is Anabaena. It shows a symbiotic relationship with cycas.
- Coralloid roots is observed in the cycas. It is developed in clusters at the base of the stem and comes out over the ground.
- Cyanobacteria play a role in fixation of nitrogen with the help of nitrogenase.

578. In the following statement about is in which characteristic not occur in this genus.
(a) The Pinus is homosporous gymnosperm, i.e. produce same type of spores
(b) The number of needles in spur of Pinus roxburghii is three
(c) Each vascular bundle in the long shoot of Pinus consists of xylem facing towards the centre of the shoot
(d) Microsporophyll of Pinus bear two micro sporangia
BVP-2013
CMC Ludhiana -2013

Ans. (a) : In gymnosperms, plants are heterosporous i.e. produce two kinds of spores: microspore (male) megaspore (female). Microspore and megaspore germination is in-situ, producing micro- and megagametophytes which are not autotrophic, and gymnosperms are not homosporous. Pinus is a monoecious gymnosperm that produced both male and female cone on the some plant as well as male and female strobili on distinct strobili.

579. The following species of Cycas is recorded in the forests of A.P.
(a) Cycas revoluta (b) Cycas pectinata
(c) Cycas beddomei (d) Cycas thomsonii
AP EAMCET-1999

Ans. (c) : In the forest of Andhra Pradesh, the cultivated species of cycas is cycas beddomei. It is grown mainly on Tirupti hills of Andhra Pradesh. Superficially similar to cycas revoluta, it has erect, solitary stem. The cycad in found in dry hot sites in the serublands of eastern India clumps of the plant are common vie pups only in mates. The plant is fairly free resistant, except as seeds and seedling, which are very vulneroble to annual grass fires.

580. Microsporangium of Cycas is placed in which of the following manner on microsporophyll ?
(a) Marginal (b) Adaxial
(c) Abaxial (d) Lateral
Rajasthan PMT-2000

Ans. (c) : The microsporophylls are arranged spirally and each microsporophylls has 2 (two) microsporangia which are arranged abaxial (away from the stem or leaves).
- Within sporangia two kinds of spores are produced one is arranged spirally along an axis to from lax or compact strobili or cones.

581. The non porous wood is present in which of the following ?
(a) Dicots (b) Monocots
(c) Gymnosperms (d) Cactus
Rajasthan PMT-2000

Ans. (c) : Gymnosperms are contemplated as 'non-porous' due to their scarcity of vessel pores. Pines are typically instances of softwood. So non-porous wood originates in gymnosperms.
- Non porous wood are the wood which do not permit transfer of water or air.

582. The term gymnosperm was introduced by
(a) Aristotle (b) Mendel
(c) Pasture (d) Theophrastus
CMC Ludhiana -2013

Ans. (d) : The tern gymnosperms was first introduced Theophrastus in 300 B.C. in his book "Enquiry into plants". Gymnosperm is derived from two Latin words. The term gymnos refers to naked and term sperms refers to the seed. These are seed producing plants in which the seed is found in an unclosed condition.

583. In Pinus, the approximate time for the fertilization after pollination is
(a) only a few hours (b) only a few days
(c) only a few weeks (d) about one year
CMC Ludhiana-2011

Ans. (d) : Pollination is the process of transferring pollen grains from the flowers male anther to female stigma.
• The pollination in pinus takes place by winds.
Fertilization takes place about 1 year after pollination, and seed maturation takes several additional months. Some seeds are shed as soon as the mature, whereas others remain within the female cones for weeks, months, or even years before being shed.

584. The gymnosperm plant nearest to angiosperm is
(a) Pinus (b) Taxus
(c) Cycas (d) Gnetum
CMC Ludhiana-2011

Ans. (d) : The gymnosperm plant nearest to angiosperm is Gnetum. Gnetophytes are closest relative to modern angiosperms and dissimilar genera of plants: Ephedra, Gnetum and Welwistchia. Like angiosperms, they have broad leaves. In tropical and subtropical zones, gnetophytes are vines or small shrub. Gnetum show

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affinities with angiosperms besides, it resembles angiopserms in several other aspects like free nuclear divisions in the embryo sac, two cotyledonous embryo etc.

585. Many xerophytes accumulate this in response to stress

(a) Glucose (b) Proline
(c) Lysine (d) Fatty acids

BCECE-2009

Ans. (b) : Many xerophytes accumulate this in response to stress by proline. In order to trade over the stress phase, many xerophytes make suitable morphological and physiological adaptations. Accumulation of free proline under water deficit is one such physiological response.

586. If the number of chromosomes in the cells of nucellus in Pinus is 24, what would be the number of chromosomes in megaspore mother cell

(a) 72 (b) 24
(c) 12 (d) None of these

AMU-2001

Ans. (b) : In this case a megaspore mother cell is a diploid cell in plants in which meiosis will occur, resulting in the production of four megaspores.

Therefore in the given example the diploid chromosomes number is 24. All the somatic cells including the pollen mother cells would have 24 chromosomes.

587. "Algal zone" is found in

(a) normal roots of Cycas
(b) normal roots of Pinus
(c) coralloid roots of Cycas
(d) stem of Cycas

AMU-2001

Ans. (c) : Coralloid roots are a special type of root that is found in cycas that is interrelated with nitrogen Fixing cyanobacteria. Algal zone is also present in coralloid roots of cycas.

588. Study the following and identify two characters found in both Cycas and Pteris

I. Formation of motile male gametes.
II. Formation of haploid endosperm.
III. Formation of sporophyte directly from gametophyte without gametic union.
IV. Formation of archegonia in female gametophyte.

The correct match is

(a) I and IV (b) I and III
(c) II and IV (d) III and IV

AP EAMCET-2007

Ans. (a) : I and IV

• Formation of motile male gametes and Formation of archegonia in female gametophytes, both characters are same in Cycas and Pteris.

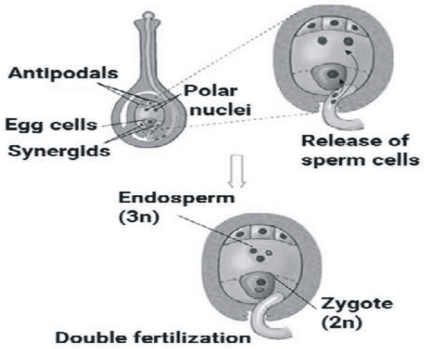
F. Angiosperms

589. Endosperm in angiosperms is:

(a) Tetraploid structure (b) Triploid structure
(c) Haploid (d) none of the above

AIIMS-2013 / J&K CET-2012
BHU PMT (Mains)-2010 / BVP-2008
Haryana PMT-2007 / Uttarakhand PMT-2007
VMMC-2007 / MHT CET-2006 / JCECE-2004
Haryana PMT-2003 /UPCPMT-2002 /J&K CET-2000

Ans. (b) : Endosperm is a triploid (3n) structure found in many seeds of angiosperm. It frequently stores food material which are broken down during germination. In angiosperm, the endosperm is the main nutritive tissue for embryo out of which two male gametes one fertilizes egg to form zygote and other fuses with secondary nuclei to form triploid endosperm. Hence, triploid nature of endosperm is the characteristic feature of angiosperm.



Double fertilization and triple fusion

590. In angiosperms, the fusion of male gamete with the secondary nucleus is considered as "Second fertilization" because

(a) It is fusion of two nuclei
(b) Secondary nucleus is a sister nucleus of the egg
(c) It takes place in embryo sac
(d) It takes place after pollination

AP EAMCET-12.07.2022 Shift-II / MHT CET-2018
J & K CET-2015 / Uttarakhand PMT-2008
MHT CET-2008 / Manipal-2008
BVP-2007 / VMMC-2006
JIPMER-2004 / BHU PMT-2004

Ans. (b) : In angiosperms, the fusion of male gamete with the secondary nucleus is considered as "second fertilization because secondary nucleus is a sister nucleus of the egg. The cells of an embryo of unfertilized ovule are 8 in number and arranged in the form of 3 + 2 + 3 (from top to bottom) 3 antipodal cell, 2 polar central nucleus, 2 sgnergids & 1 egg cell. One sperm fertilizes the egg cell and the other sperm combines with the two polar nuclei sperm. The haploid sperm and haploid egg combine to form a diploid zygote and this process is called as synngamy while other sperm and two haploid polar nuclei form a triploid nucleus (triple fusion).

591. Double fertilization was discovered by:

(a) Nawaschin (b) Strasburger
(c) Emerson (d) None of these

MHT CET-06.10.2020 Shift-I /MHT CET-2018
Haryana PMT-2005 / BHU PMT-2003

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Ans. (a) : Double fertilization was discovered by Nawaschin and Guignard. Double fertilization is the characteristic of angiosperms. In this process, one male gamete fuses with the egg to form a zygote.

- Nawaschin discovered double fertilization in 1898, in the liliaceous plants.

592. In an angiospermic plant female, gametophyte is represented by:

(a) ovule (b) embryo sac
(c) endosperm (d) none of these

Rajasthan PMT-1996 /Rajasthan PMT-2011
UP CPMT-2010 / Haryana PMT-2002
AP EAMCET-2000

Ans. (b) : Female gametophyte is represented by embryo sac. The embryo sac develops from the functional megaspore. In angiosperms it is required for sexual and asexual seed development. It consists of 3-antipodal cells, one central cell one egg cell and two synergid cells.

593. Largest flower is

(a) *Rafflesia arnnoldi* (b) *Helianthus annuus*
(c) *Welwitschia mirabilis* (d) *Nelumbo nucifera*

KVPY SB & SX-2016 / Punjab MET-2008
AIIMS-1998 / Rajasthan PMT-1996

Ans. (a) : *Rafflesia arnnoldi* is a species of flowering plant in the parasitic genus Rafflesia. It is noted for producing the largest individual flower on earth. It has a very strong and horrible odour of decaying flesh, earning it the nickname "corpse flower"

594. The male gametophyte in angiosperm is reduced to

(a) one cell (b) two cells
(c) three cells (d) four cells

CMC Vellore-2009 / CG PMT-2009
Rajasthan PMT-2009 / UP CPMT-2009

Ans. (c) : In pinus the male gametophyte is much smaller than the female gametophyte. It is made up of three cells. The male gametophytes of angiosperms is composed of one tube cell and one generative cell. This generative cell divides to form two male gametes. So, the angiospermic male gametophyte is 3-celled.

595. Double fertilization is a characteristic of:

(a) angiosperms (b) gymnosperms
(c) thallophytes (d) all plants

CG PMT-2008 / Manipal-2008
BVP-2007 / BVP-2005

Ans. (a) : • Double fertilization is a characteristic of angiosperm. It was first discovered by S.G. Nawaschin (1898). Double fertilization where a triploid endosperm is formed as a result of the fusion of secondary polar nuclei a male gamete. A diploid zygote is formed by the fusion of a haploid egg cell and a haploid male gamete.

596. If an angiospermic male plant is diploid and female plant tetraploid, the ploidy level of endosperm will be:

(a) haploid (b) triploid
(c) tetraploid (d) pentaploid

HP CET-2013 / Uttarakhand PMT-2008
BHU PMT-2004 / VMMC-2003

Ans. (d) : When a diploid female plant is crossed with a tetraploid male. The ploidy of endosperm cells in the resulting seed is pentaploid. The endosperm is formed by fusion male gamete with two polar nuclei, i.e. fusion of two diploid polar nuclei and haploid male gamete will give pentaploid (5n). The primary endosperm nucleus and eventually pentaploid endosperm.

Male gamete +2 polor nuclei → Endosperm
(n) + (2n) + (2n) = (5N).

597. Double fertilization (or triple fusion) leading to initiation of endosperm in angiosperms, requires

(a) fusion of 4 or more polar nuclei and the second male gamete only
(b) fusion of 2 polar nuclei and second male gamete only
(c) fusion of one polar nucleus and second male gamete only
(d) all the above type of fusions in different types of angiosperms

Haryana PMT-2010/ AFMC-2007
AMU-2002 / UP CPMT-2001

Ans. (b) : Double fertilization (or triple fusion) leading to initiation of endosperm in angiosperms, requires fusion of Two polar nucleus and second male gamete only.

598. Male gametes in angiosperms are formed by the division of

(a) Microspore (b) Generative cell
(c) Vegetative cell (d) Microspore mother cell

Rajasthan PMT-2010 / Haryana PMT-2008
JIPMER-2008 / MHT CET-2004

Ans. (b) : Male gametes in angiosperms are formed by the division of generative cell. It is formed during the microspore's first division and divides into two sperm cells in the pollen grain or pollen tube. As a result, the generative cell is never "Free" from the vegetative cell.

599. Negative geotropism is shown by the roots of

(a) Orchids (b) Ficus
(c) Rhizophora (d) Trapabispinosa

BVP-2011 / Rajasthan PMT-2006
BVP-2004 / BCECE-2001

Ans. (c) : Negative geotropism is shown by the roots of Rhizophora. It is shown by roots called pneumatophores. These plants have pneumatophores which help in harnessing oxygen for respiration.

600. Which of the following is a total root parasite?

(a) Cuscuta (b) Rafflesia
(c) Santalum (d) Monotrapa

JIPMER-2012 / Uttarakhand PMT-2009
JIPMER-2010 / Haryana PMT-2000

Ans. (b) : Rafflesia arnoldii is a species of flowering plant which belongs to the parasitic genus Rafflesia. It is the most famous species as it produces the biggest individual flower on earth and is also known as the corpse lily or stinking corpse lily. They lack in chlorophyll and does not prepare their own food. They take their food along with water and minerals from the roots of the host plant and depend on the host, such plant is known as a total root parasite.

601. The smallest angiospermic flower is

(a) Wolffia (b) Renunculus
(c) Rafflesia (d) Stellaria

Punjab MET-2009 / CMC Vellore-2009
UP CPMT-2009 / Rajasthan PMT-2001

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Ans. (a) : The smallest angiospermic flower is Wolffia, which is an aquatic plant. They are green or yellow-green and have no roots.
- It is less than 2 mm in measurement and it is a genus of 9-11 species, which include the smallest flowering plants.

602. Primary endosperm nucleus is formed by fusion of
(a) Two polar nuclei and two male gametes
(b) Two polar nuclei and one male gamete
(c) Ovum and male gamete
(d) One polar nucleus and male gamete

Karnataka CET-20.05.2023

Ans. (b) : In gymnosperms primary endosperm nucleus is formed by the fusion of two haploid polar nuclei and one haploid male gamete (nuclei).

603. Which of the following statements regarding endosperm of angiosperms are true?
A. Endosperm is formed by triple fusion
B. Endosperm is nutritive in function
C. It is a pre-fertilized structure
D. It may or may not be completely utilized by the developing embryo
(a) A, B & D (b) A, B & C
(c) B, C & D (d) A, C & D

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : In gymnosperm, endosperm is formed by the triple fusion/ double fertilization.
Endosperm rich in fat, carbohydrate and proteins which are used in the establishment of the seedling during seed germination. At the time of fertilization endosperm provide nutrition of developing embryo. Sometimes endosperm may or may not be completely used by the developing embryo.

604. Arrange the following events in the correct sequence during the process of fertilization in Angiosperms

I) Fusion of other male gamete with polar nuclei
II) Transfer of pollen grains form anther to stigma
III) Fusion of male gamete with egg nucleus
IV) Release of male gametes in to cytoplasm synergid
V) Pollen tube formation

(a) II III IV I II
(b) I IV V II III
(c) II V IV III I
(d) V IV I II III

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : The correct sequence during the process of fertilization in Angiosperm is-Transfer of pollen grains form anther to stigma→pollen tube formation→ Release of male gametes in to cytoplasm synergid→ fusion of male gamete with egg nucleus → fusion of other male gamete with polar unclei.

605. In angiosperms the correct sequence of events in formation of female gametophyte in the ovule is
(A) **3 successive free nuclear divisions in functional megaspores.**
(B) Degeneration of 3 megaspores.
(C) Meiotic division in megaspore mother cell.
(D) Migration of 3 nuclei towards each pole
(E) Formation of wall resulting in seven celled embryo sac.

Choose the correct answer from the options given below.
(a) (B), (C), (A), (D), (E)
(b) (C), (B), (A), (D), (E)
(c) (A),(B), (C), (D), (E)
(d) (C), (E), (A), (D), (B)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : The female gametophyte develops within the ovule and generally consists of three antipodal cells one central cell, two synergic cells and one egg cell.
- Female gametophyte is also commonly called the embryo sac or mega gametophyte.

(i) The megaspore mother cell undergoes meiosis and forms four haploid megaspores.
(ii) One remains functional and three degenerate.
(iii) 3 successive free nuclear divisions in functional megaspore take place.
(iv) Migration of 3 nuclei towards each pole.
(v) Formation of wall resulting in seven called embryo sac.

606. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are :
(a) Synergids, antipodals and Polar nuclei
(b) Synergids, Primary endosperm nucleus and zygote
(c) Antipodals, synergids, and primary endosperm nucleus
(d) Synergids, Zygote and Primary endosperm nucleus

NEET (UG) 07.05.2023

Ans. (d) : Embryo sac or female gametophyte is an oval structure present in the ovule of flowering plants.
- Synergids are pair of haploid cells present at the micropylar end of embryo sac zygote which is a diploid structure undergoes divisions to form embryo, antipodal and polar nuclie are also haploid, diploid and triploid structures are synergid zygote and primary endosperm respectively.

607. Match the following :

	List-I		List-II
(A)	**Submerged suspended hydrophytes**	**(I)**	**Pistia**
(B)	**Root caps are absent**	**(II)**	**Sagittaria**
(C)	**Rooted hydrophytes with Floating leaves**	**(III)**	**Utriculaira**
(D)	**Plants live partly in water and partly in air**	**(IV)**	**Nymphaea**

The correct match is:

	A	B	C	D
(a)	II	IV	I	III
(b)	II	I	IV	III
(c)	III	I	IV	II
(d)	III	IV	I	II

TS EAMCET-31.07.2022 Shift-II

Ans. (c) : Submerged hydrophytes are the plants which have their roots anchored in the mud at me bottom of the water body. Example - Utricularia.
- Root cap is absent in hydrophytes instead root pockets are present in them. Example - Pistia
- Roots hydrophytes with floating leaves are the plants which are rooted in the mud but their leaves and flower float on the water surface. Example - Nymphea
- Plant living partly inside water and partly above it are called Halophytes. Example - Sagittaria

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608. Identify free floating hydrophyte from the following.
(a) Lemna (b) Hydrilla
(c) Utricularia (d) Vallisneria

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : Free floating hydrophyte are plants that float freely on the surface of water bodies constantly. For example Wolfia Lemna, Salvinia.

609. Number of cells in the Angiosperm pollen grains at the time of release are-
(a) 2 cells (b) 3 cells
(c) 1 cells (d) 4 cells

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : In the angiosperm pollen grains at the time of release have 2 cells. That is vegetative cell and generative cell. Pollen grains of Angiosperms are most simplified of all the seed plants. Male gametophyte or pollen grain produces three cells one vegetative cell which later forms pollen tube and two sperm cells.
Inside the pollen are two cell that comprise the male gametophyte and the tube cell (also referred to as the tube nucleus) which develops into the pollen tube.

610. One of the 2000 years old viable seed, discovered during the archeological excavation at king herold's near dead sea
(a) Maize (b) Sunflower
(c) Lupin (d) Phoenix dactylifera

Karnataka CET-2022

Ans. (d) : Phoenix dactylifera which is also known as date palm. It is a flowering plant and belongs to arecaceae family. It is one of the 2000 years old viable seed, discovered during the archeological excavation at king herold's near dead sea.

611. Find the correct character related to double fertilization of Angiosperms.
(A) Male gametic nucleus fuses with egg cell.
(B) Male gametic nucleus fuses with antipodal cells.
(C) Male gamete fuses with synergids.
(D) Male gamete helps in the formation of primary endosperm cell.
Options:
(a) A, B only (b) A, D only
(c) A, C only (d) C, D only

TS EAMCET-31.07.2022 Shift-I

Ans. (b) : Double fertilization is the characteristic of angiosperm. In this process one male gamete fuses with the egg to form a zygote which is known as syngamy. The other male gametes fuses with the two polar nuclie in the central cell to form a triploid primary endosperm nucleus or PEN.
Hence, statement A & D are correct.

612. Match the following lists.

List-I		List-II	
A.	**Submerged rooted hydrophyte**	**I.**	**Hydrilla**
B.	**Rooted hydrophyte with floating leaves**	**II.**	**Salvinia**
C.	**Free floating hydrophyte**	**III.**	***Victoria regia***
D.	**Submerged suspended hydrophyte**	**IV.**	**Limnophila**
		V.	**Vallisneria**

The correct match is
Options:

	A	B	C	D
(a)	III	I	V	IV
(b)	V	III	II	I
(c)	V	I	IV	III
(d)	II	IV	III	I

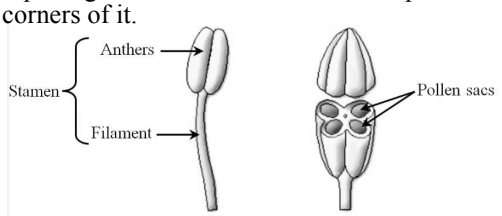
TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Vallisneria is a submerged rooted hydrophyte. They are immersed in water and their roots are embedded in the mud.
Victoria regia is rooted hydrophyte with floating leaves. These plants are rooted in mud but their leaves and flowers float on the water surface for example Nymphaea, Marsilea.
Free floating hydrophyte are plants that float on the surface of water bodies for example Salvinia.
Hydrilla is a submerged suspended hydrophyte and they grow below the water and do not come in contact with the atmosphere. Other examples of submerged suspended hydrophyte are ceratophyllum, Utricularia.

613. How many microsporangia are located at the corners of a typical bilobed anther of angiosperm?
(a) 2 (b) 4
(c) 8 (d) 1

Karnataka CET-2021

Ans. (b) : Four microsporangia are located at the corners of a typical bilobed anther of angiosperm. Microsporangium is a sporangial structures which produces spores. Anther of angiosperms shows two anther lobes. Each anther lobes develops into two microsporangium. Hence anther has four pollen sacs at four corners of it.



Structure of stamen

614. Vivipary is a peculiar characteristic of
(a) Mesophytes
(b) Xerophytes
(c) Mangrooves
(d) Emergent hydrophytes

MHT CET-01.10.2020 Shift-I
BVP-2014

Ans. (c) : Adaptation of vivipary has mostly occured in some halophytes. Vivipary plants grow in highly saline area. Mangrooves plant of high salt tolerent grows in water of high salinity.
• Mesophytes are plants that require a moderate amount of water.

615. In angiosperms, the endosperm is classified on the basis of which one of the following criteria?
(a) Development (b) Position
(c) Ploidy (d) Function

MHT CET-07.10.2020 Shift-I

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Ans. (a) : In angiosperms, the endosperm is classified on the basis of development. Angiosperms have three types of endosperms which are categorized based on the timing of cell wall production by plant species. The nuclear, cellular & helobial endosperms are among them.
• Endosperm is present in the seeds of most of the angiosperms. It provides nourishment to the growing embryo.
• Ploidy level of endosperm in angiosperm is generally triploid or 3n.

616. Which one of the following pairs gives rise to fruit and seed, respectively, in a typical angiosperm plant?
(a) Ovule and ovary (b) Ovary and pollen
(c) Pollen and anther (d) Ovary and ovule
KVPY (SA)-2020

Ans. (d) : The fertilization in plants brings about various changes in the structure of a flower. In the majority of the cases, withdraw all the parts of the flower i.e. calyx, carolla and androecium except the ovary which remain on the thalamus. The ovary grows and eventually transforms into the fruit that contains the seeds. A fertilized mature ovary is what is known as a fruit.
• After fertilization, the megasporangium or ovule becomes the seed.

617. During the development of male gametes in angiosperms, the microspore mother cell undergoes _____ meiosis and _____ mitosis respectively.
(a) two and two (b) two and one
(c) one and two (d) one and three
MHT CET 5.10.2020 Shift-I

Ans. (c) : During the development of male gametes in angiosperms, the microspore mother cell undergoes one meiosis and two mitosis respectively.

618. The correct sequence of developmental stages of embryo in angiosperms is _____.
(a) octant → globular → heart shaped → horse shoe shaped
(b) globular → octant → heart shaped → horse shoe shaped
(c) octant → heart shaped → horse shoe shaped → globular
(d) octant → horse shoe shaped → heart shaped → globular
MHT CET-06.10.2020 Shift-I

Ans. (a) : Intialy, the single-celled zygote divides to form a proembryo. The zygote develops inside the seed. The sequence of development proceed through histo-differentiation, cell expansion and maturation drying. As the divisions proceed, the proembryo subsequently gives rise to the globular stage embryo. The globular stage embryo gives rise to a heart-shaped embryo which finally develops into a mature embryo. The mature dicot embryo has two cotyledons and an embryonal axis.

619. Which of the following cell-type is not dead at maturity in angiosperms ?
(a) Sieve tube elements (b) Phloem fibres
(c) Vessels (d) Xylem fibres
TS EAMCET-08.05.2019 Shift-I

Ans. (a) : In plant anatomy, sieve tube elements also called sieve tube members are highly specialized type of elongated cell in the phloem tissue of flowering plants unlike the water - conducting xylem vessel elements that are dead when mature sieve elements are living cells.
Phloem fibres are generally absent in the primary phloem but are found in the secondary phloem and hemp are made of dead sclerenchymatous cells.

620. In which of the following plants, hydrophily is a common phenomenon
(a) Water hyacinth (b) Water lily
(c) Hydrilla (d) Amorphophallus
TS EAMCET-08.05.2019 Shift-I
UP CPMT-2010

Ans. (c) : Pollination carried out through water is called Hydrophily.
• Pollination by water quit rare in flowering plant and it is limited to about 30 genera mostly monocotyledones.
• Some examples of water pollinated plants are vallisneria and Hydrilla which is grown in fresh water and several marine sea grasses such as zosteria.

621. Features which are highly unique to angiosperms.
(I) Multicellular, much reduced and dependent gametophyte
(II) Siphonogamous fertilization
(III) Fusion of male gametes with egg cell and secondary nucleus
(IV) Development of ovule into seed
Options:
(a) II & III (b) I & II
(c) I & III (d) II & IV
AP EAMCET-24.04.2019 Shift-I

Ans. (c) : (I) In angiosperms, the female gametophyte is 7-celled and 8 nucleated, but the male gametophyte, known as pollen grain, is confined to 2-3 cell. Both are greatly diminished and reliant on the sporophyte.
(II) Double fertilization is the unique characteristics of angiosperms. Fusion of male gametes with egg cell is called syngamy and Fusion of male gametes with secondary nucleus is called triple fusion.
(III) The fertilization in which a long pollen tube that carry male gametes near to the egg cell is known as siphonogamous fertilization.
(IV) The ovule develops into a seed both in angiosperm and gymnosperm.
Hence, statement I & III are highly unique to angiosperms.

622. The additional nuclear ploidy levels found in a diploid angiosperm species in full bloom compared to its vegetative stage are
(a) 1 N & 2N (b) 2N & 3N
(c) 3N & 4N (d) 1N & 3N
KVPY SB & SX-2019

Ans. (d) : In diploid species ploidy level is 2N, while additional ploidy level are 1N and 3N.
1N→found in gametes and 3N→found in endosperm (triploid).

623. Find the incorrect statements
(A) Lower plants shift to sexual method of reproduction just before the onset of adverse conditions takes place

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(B) In South India, hilly areas transform into blue stretches by the flowering of Agave and Bamboo
(C) Single cell Zygote is the vital link that ensures continuity of the species from one generation to the next
(D) In Angiosperms pollen grains are shed at 3–celled stage

Options:

(a) A, B (b) C, D
(c) A, C (d) B, D

AP EAMCET-25.04.2018 Shift-II

Ans. (d): • In South India, Hilly areas transform in to blue stretches by the flowering of Neelakurinji (*Strobilanthes kunthiana*). It flowers only once in 12 years.
• In Angiosperms pollen grains are shed at 2-celled stage, contain one vegatative and one generative cell.

624. In plants growing under environmental stress condition, seeds germinate while they are on the mother plant. An example for such a condition is:

(a) Wolffia (b) Brown algae
(c) Rhizophora (d) Eucalyptus

TS EAMCET-02.05.2018 Shift-II

Ans. (c) : In plants growing under environmental stress condition (such as drought, high salinity low and high temperature and light condition), seed germination occurs on the mother plant. An example of such a condition is Rhizophora which grow on mangrove vegetation.

625. What is the correct order stages for monosporic development of female gametophyte in angiosperms, arrange in sequence.

(I) Functional megaspore
(II) Free nuclear divisions
(III) Embryosac
(IV) Linear tetrad of megaspore
(V) Megaspore mother cell

(a) II, I, IV, V, III (b) I, II, IV, V, III
(c) V. IV, I, II, III (d) IV, V, I, II, III

AP EAMCET-25.04.2018 Shift-I

Ans. (c) : Monosporic development refers to the formation of a female gametophyte or embryosac from a single functional megaspore. In most flowering plants a single megaspore mother cell present at the micropylar pole of the nucleus region of the ovule undergoes meiosis to form four haploid megaspores later, out of these four megaspores only one functional megaspore are found into the female gametophyte, while the remaining three degenerate. The functional megaspore elongates along micropylar chalazal axis which is followed by mitotic division and then develops into the female gametophyte.

626. Match the following

List -I		List-II	
(A)	**Amphibious plants**	**(i)**	**Tribulus**
(B)	**Submerged suspended hydrophytes**	**(ii)**	**Barley**
(C)	**Mesophytes**	**(iii)**	**Sagittaria**
(D)	**Xerophytes**	**(iv)**	**Lemna**
		(v)	**Utriculari a**

The correct answer is

	(a)	**(b)**	**(c)**	**(d)**
(a)	(iii)	(v)	(ii)	(i)
(b)	(iv)	(iii)	(i)	(ii)
(c)	(v)	(i)	(iv)	(iii)
(d)	(ii)	(iv)	(v)	(i)

TS EAMCET-03.05.2018 Shift-I

Ans. (a) : They are water living plants, needs moisture to complete its life cycle. Plant body is not differentiated into true root, stem and leaves. Hence, they are referred to as amphibious plants.
Ex: Sagittaria
• Submerged hydrophytes are the plants which have their roots anchored in the mud at the bottom of the water body.
Ex: Utricularia
• Mesophytes are terrestrial plants which are neither adopted to particularly dry nor particularly wet environment.
Ex: Barley
• A xerophytes is a species of plant that has adapted to survive in an environment with little water.
Ex: Tribulus

627. Select the mismatch :

(a) Pinus – Dioecious
(b) Cycas – Monoecious
(c) Salvinia – Heterosporous
(d) Equisetum – Homosporous

NEET-2017

Ans. (a) : Pinus is the gymnosperm which posses both male and female reproductive parts and thus called **monoecious** and is generated on the same plant.

• On other hand, cycas possess either male or female reproductive so, it is dioecious. Equisetum produces the same type spore (Homosporous) and Salvinia produces different types of spores (Heterosporous).

628. With respect to angiosperms, identify the incorrect pair from the following

(a) Antipodal–2n
(b) Vegetative cell of male gametophyte –n
(c) Primary endosperm nucleus –3n
(d) Cell of nucellus of ovule –2n

JIPMER-2017

Ans. (a) : All of the cells in the embryo sac are haploid, with the exception of the central cell, which is initially binucleate until fusing its polar nuclei to become diploid. A main endosperm nucleus carrying 3n is created upon fusing with one of the male gametophytes (n).The three cells on the chalazal end of the embryo sac are called antipodal cells. They are the haploid.

629. Study the following lists

List - I	List-II
(A) Convolvulaceae	**(i) Dicotyledons**
(B) Rosales	**(ii) Arthropoda**
(C) Mangifera	**(iii) Anacardiaceae**
(D) Insecta	**(iv) Polemoniales**
	(v) Monocotyledons

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The correct answer is–

Options :

	A	B	C	D
(a)	iv	i	v	ii
(b)	iv	i	iii	ii
(c)	iv	i	v	iii
(d)	iv	i	ii	iii

AP EAMCET-28.04.2017 Shift-I

Ans. (b) :

A.	Convolvulaceae	Polemoniales
B.	Rosales	Dicotyledons
C.	Mangifera	Anacardiaceae
D.	Insecta	Arthropoda

Convolvulaceae:- is polemoniales as it includes plants families like convovulaceae mostly due to their floral and sexual characteristics.
A single superior complex ovary and flowers with stamens. That are adjacent to the corolla lobes.
Rosales : - Rosales are dicotyledonous flowering plants, containing a families, 261 genera, and more than 7,700 species.
Mangifera:- Mangifera indica belong to the family of Anacardiceae, commonly known as mango family.
Insecta :- The word 'arthropod' refers to all invertebrates with jointed legs. Arthropods have hard exoskeleton. They don't have bones inside their bodies like humanr

630. Study the following and identify the correct combinations :

S.No.	List–I	List–II	List–III
I.	**Calotropis**	**Cardiac glycosides**	**Highly poisonous**
II.	**Nicotine**	**Chemical substance**	**Defence against grazers and browsers**
III.	**Gause**	**Competitive exclusion**	**Superior species will eventually eliminate other inferior species**
IV.	**Mac Arthur**	**Co-existence**	**Same foraging pattern**

The correct combinations are

Options:

(a) I, III, IV
(b) I, II, III
(c) II, III
(d) II, III, IV

AP EAMCET-28.04.2017 Shift-II

Ans. (b) : (i) Calotropis- The species calotropis produces highly poisonous cardiac glycosides that distort the functioning of the heart.
(ii) Nicotine- Nicotine is the chemical substance used by plants for protection against active grazers and browsers.
(iii) Gause competitive exclusion principle states that "The two different species cannot occupy, the same niche in the same geographic area. If they do they will compete with one another for the same food and other resources. The superior species will eventually eliminate other inferior species.

631. If the cells of the nucellus in the angiosperm ovule contains 24 chromosomes, what will be the number of chromosomes in the endosperm of a self pollinated flower?

(a) 12 (b) 24
(c) 36 (d) 48

MHT CET-2017

Ans. (c) : Somatic cells of angiosperms are diploid.
The ovule is diploid
Hence, $2n = 24$
So $(n) = 12$
Since, the endosperm is triploid $3n = 3 \times 12 = 36$

632. The megasporangium proper of an angiosperm ovule is represented by

(a) Integument (b) Funicle
(c) Nucellus (d) Micropyle

MHT CET-2017

Ans. (c) : Nucellus is the megasporangium in an angio sperm ovule. Nucellus is the inner part of the ovule. Cells of nucellus are diploid. Sometime when the ovule is immature the nucellous contain the megaspore mother cell which divides meiotically to give rise to megaspore.

633. The plant Drosera is a

(a) saprophytic (b) insectivorous
(c) parasitic (d) endophytes

SRM JEEE -2017

Ans. (b) : Sundew, genus of approximately 152 carnivorous plant sp. in the family Droseraceae. Drosera or sundews are one of the most variegated species of insectivorous plants, which trap prey with the help of their mucilaginous gland covering their leaves, they trap flies insects, butterflies.

634. Triple fusion in angiosperm is the fusion of second sperm with

(a) Antipodal cell and one synergid cell
(b) Two antipodal cells
(c) Two synergid cells
(d) Two polar nuclei

Punjab MET-2008

Ans. (d) : Triple fusion in angiosperm is the fusion of second sperm with two polar nuclei. Fertilization in angiosperm comprises two important events-syngamy and triple fusion. In syngamy one of the sperm released by the pollen tube in the embryo sac fuses with the egg cell and forms a diploid zygote which further develops into embryo. "Triple fusion is a characteristic feature in angiosperm where the sperm nucleus fuses with the secondary polar nuclei in the embryo sac" and other sperm fuse with secondary polar nuclei form triploid Primary endosperm nucleus (PEN) which is develop into endosperm called triple fusion.

635. ……..is a CAM plant.

(a) Maize (b) Pineapple
(c) Onion (d) Pea

Punjab MET-2008

Ans. (b) : • Crassulacean acid metabolism also know as CAM photosynthesis is a carbon fixation pathway that evolved in some plants as an adaptation to arid conditions. Pineapple carries out CAM photosynthesis,

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fixing carbon dioxide at height and storing it as the acid malate and then releasing it during the day aiding photosynthesis.

636. Sucking roots are present in the plant

(a) Betel (b) Cuscuta
(c) Mangifera (d) Solanum

Punjab MET-2008

Ans. (b) : sucking roots also known as houstorial roots are found in parasitic plants.
In parasitics plant adventitious roots form the stem sucking nourishment from the host plants tissue like cuscuta (dodder), cassytha and dendrophthoe are other example of sucking roots.

637. Which of the following is the first cell of female gametophytic generation in Angiosperms?

(a) Megaspore mother cell
(b) Microspore mother cell
(c) Functional megaspore
(d) Egg cell

MHT CET-2016

Ans. (c) : The mother cell of megasporangium goes through meiosis and form megaspore quadruplicate out of which one megaspore is functional. Functional megaspore divides from mitotically developed into embryo sac for example the female gametophyte. In this way the function/megaspore fills in as the primary cell of the female gametophyte.

638. In Angiosperms, megaspores formed after meiosis of megaspore mother cell are arranged in____

(a) Isobilateral tetrad (b) Linear tetrad
(c) Tetrahedral tetrad (d) T-shaped tetrad

MHT CET-2016

Ans. (b) : In Angiosperms, megaspores formed after meiosis of megaspore mother cell are arranged in linear tetrad. The development of megaspores from the megaspore mother cell is called megasporogenesis.
• Megaspore mother cell is a large cell with dense cytoplasm and differentiated nucleus.
• In most angiosperms the megaspore mother cell divides through meiosis and forms 4 megaspores.
• Three of these megaspore degenerate and only one is active.
• Active megaspore forms female gametophyte

639. The CORRECT sequence of events during double fertilization in Angiosperms is

(a) Triple fusion, syngamy, porogamy
(b) Syngamy, triple fusion, porogamy
(c) Porogamy, syngamy, triple fusion
(d) Syngamy, porogamy, triple fusion

MHT CET-2016

Ans. (c) : Double fertilization involves two sperm cell: one fertilizes the egg cell to form the zygote that process is called syngamy and other fuses with two polar nuclei to form endosperm and that process is called triple fusion.
The entry of the pollen tube in the egg apparatus through micropyle (porogamy) is followed by syngamy and triple fusion.
Thus, the correct sequence is porogamy, syngamy triple fusion.

640. In angiosperms, during development of embryo, the suspensor cells develop from

(a) Oospore (b) Integument
(c) Endosperm (d) Cotyledon

MHT CET-2015

Ans. (a) : In angiosperms during development of embryo the suspensor cells develop from the oospores. During the development of the embryo the zygote increases in size and is divided by a transverse division resulting in the formation of two unequal cells.
It is a fertilized female zygote which have a thick cellulose wall. The suspensor cell situated at the terminal end of the suspensor is called the hypophysis which undergoes numerous division and the cell then later on forms the initials of the radical root, protoderm and root cap.

641. Seeds of the orchids are :

(a) Minute and sticky (b) Light and dry
(c) Large and heavy (d) None of these

JIPMER-2002

Ans. (b) : Seed of the orchids are light, small and dry They are generally stored inside a pod-like structure and on average an orchid seed weighs 0.004 mg.

642. Double fertilization results in the production of :

(a) Haploid nucleus (b) Diploid nucleus
(c) Triploid nucleus (d) Tetraploid nucleus

J&K CET-2005
BHU PMT (Mains)-2011

Ans. (c) : Double fertilization results in the production of Triploid nucleus. In angiosperms, double fertilization results in the production of an embryo and endosperm both of which are critical for the development of viable seed. Diploid plants produce diploid embryos and triploid endosperm tissue. The endosperm has two genome of the maternal parent and one genome of the paternal parent. Nuclei that possess only one set of chromosome are haploid. The nuclei will possess a single gene copy allele for each trait. In Gymnosperm the nature of endosperm is haploid.

643. The phloem of angiosperms differs from that of other vascular plants by the presence of

(a) vessels (b) companion cells
(c) tylosoides (d) albuminous cells
(e)secretory cells

CMC Vellore-2008

Ans. (b) : The phloem of angiosperms differs from that of other vascular plants by the presence of companion cells. These are specialised thin walled parenchymatous cells present adjacent to sieve tube in the phloem.
It appears to regulates the activity of the adjacent sieve element and to take part in loading and unloading of sugar into the sieve element.

644. An angiospermic leaf carries 16 chromosomes. The number of chromosomes in its endosperm will be

(a) 16 (b) 24 (c) 12 (d) 8
(e) 32

CMC Vellore-2008

Ans. (b) : A somatic cell contains diploid number of chromosomes. In angiosperms, the endosperm is formed

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by triple fusion such as fusion of two polar nuclei and second male gamete. Therefore, it is triploid (3n)
Hence, $2n = 16$

$$n = \frac{16}{2} = 8$$

Chromosomes number in endosperm will be 3n
$= 3 \times 8 = 24$

645. Conifers differ from grasses in the
(a) production of seed from ovules
(b) lack of xylem tracheids
(c) absence of pollen tubes
(d) formation of endosperm before fertilization

JCECE-2014

Ans. (d) : Formation of endosperm before fertilization (in gymnosperms) occurs in conifer while in grasses endosperm are formed after fertilization.
Poaceae is a large and nearly ubiquitous family of monocotyledonous flowering plant commonly known as grasses. Difference between conifers and grasses.

Conifers	Grasses
• The endosperm is formed before fertilization	• The endosperm is formed after fertilization
• Nutrition is provided to the embryo by archegonia	• Nutrition is provided to the embryo by endosperm

646. Which of the following plant shows multiple epidermis?
(a) Croton (b) Atlium
(c) Nerium (d) Cucurbits

BVP-2007

Ans. (c) : Nerium is xerophytes that shows multiple epidermis. They consist of many layers and are found in Nerium leaves.
Both the adaxial and abaxial epidermis in nerium are multiseriate, being composed of up to 3 layers of compactly arranged cells with heavily cutinized other walls.

647. *Pentadiplandra brazzeana* produces a protein called brazzein which is about 2,000 times as sweet as sugar. This plant belongs to :
(a) Australia (b) South America
(c) Africa (d) Canada

BVP-2006

Ans. (c) : *Pentadiplandra brazzeana* produces a protein called brazzein which is about 2,000 times as sweet as sugar. This plant belongs to africa.

648. The plants which can refix CO_2 released during respiration and use it during photosynthesis are known as :
(a) succulents (b) mesophytes
(c) hydrophytes (d) non- succulents

BVP-2006

Ans. (a) : The plants which can refix CO_2 released during respiration and use it during photosynthesis are known as succulents. They are plants with parts that are thickened, fleshy and engorged, usually to retain water in arid climates or soil conditions. The word succulent comes from the latin word sucus, meaning "juice or sap"

649. Which of the following does not obtain its nitrogen from captured animal i.e., is not an insectivorous plant ?
(a) Orobanche (b) Utricularia
(c) Drosera (d) All of these

BVP-2006

Ans. (a) : *Orobanche uniflora* (broomrapes) are generally small which is 10-60 cm. They are identified by the yellow to straw-coloured stem completely lacking chlorophyll bearing yellow, white or blue snapdragen-like flower. The flower shoot are scaly with a dense terminal spike of 10-20 flower in most species although single in one-flowered broomrape. These plants generally flower from late winter to late spring. The reproduction in these species occurs through spores.

650. Which of the following is not a feature of mangrove plant ?
(a) production of respiration roots called pneumatophores
(b) lack of slit like prop root
(c) viviparous method of germination of seeds
(d) all of the above

BVP-2006

Ans. (b) : Mangrove plants are found in marshy areas. In such plants many roots come out vertically above the ground. These are hollow roots and are called pneumatophores. They facilitate exchange of gases in roots.
In banyan trees hanging roots come out from branches. The hanging roots then go into the soil to provide additional support to the huge banyan tree such root are called prop roots.

651. In a dicot plant, the epibasal tier forms (1) cotyledons (2) Plumule (3) hypocotyl (4) radical
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (b) : In the dicot embryo the epibasal cells eventually form the two cotyledons and the plumule. The hypocotyl is the region between the cotyledons and the radicle. The radicle is the terminal tip of the hypocotyl and will form the primary roots. The epicotyl plays an important role in hypogeal germination.

652. Velamen tissue is found in :
(a) mesophytes (b) epiphytes
(c) hydrophytes (d) xerophytes

BCECE-2001

Ans. (b) : Velamen tissue is found in epiphytes. Such as in orchids and clivia species aerial roots. It is a multilayered tissue that is spongy in nature which covers the aerial roots of epiphytic plants such as Orchids. It helps in the absorption of water.

653. The ovule in which the funicle, chalaza and micropyle lie in one vertical plane, is called
(a) Campylotropous (b) Amphitropous
(c) Orthotropous (d) Anatropous

J&K CET-2011

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Ans. (c) : The ovule in which the funicle, chalaza and micropyle lie in one vertical plane, is called orthotropous. Orthotropous ovule is the simplest and very primitive type of ovule. Micropyle, funicle and chalaza lie in one vertical plane. Examples of plants having orthotropous ovules are piper. Nigrum, polygonum, piper betal and all gymnosperms.

654. Which is regarded as urinary bladder of embryo?

(a) Amnion (b) Allantois
(c) Chorion (d) Yolk sac

BVP-2009

Ans. (b) : Allantois is regarded as urinary bladder of embryo. Allantois collect liquid waste from the embryo. It also helps in the exchange of respiratory gases. The chorionic fluid protects the embryo from exchange of nutrients, oxygen and waste products.

655. Double fertilization occurs in

(a) Riccia (b) Pteridium
(c) Cycas (d) Capsella

JIPMER-2011

Ans. (d) : Double fertilization occurs in capsella. It is the characteristic feature of angiosperms plants. Double fertilization in flowering plant reproduction, the fusion of the egg and sperm and the simultaneous fusion of a second sperm and 2 polar nuclei that ultimately results in the formation of the endosperm of the seed.

• Capsella is a biennial and a herbaceous plant present in brassicaceae of the mustard family.

656. The fertilization in which male gametes are carried through pollen tube is known as

(a) syngamy (b) porogamy
(c) siphonogamy (d) chalazogamy

Manipal-2008

Ans. (c) The fertilization in which male gametes are carried through pollen tube is known as siphonogamy. It is a condition in plants where pollen tubes are developed for the transfer of the male cells to the egg. The seed plants are siphonogamons while in lower plants the male cells usually swim to the eggs. As a consequence the spermatophytes are called as siphonogamons by some botanists.

657. Read the following statements and identify the correct options given

(A) Angiosperms range in size from microscopic Wolffia to tall trees of Eucalyptus
(B) In angiosperms, the seeds are enclosed by fruits
(C) Double fertilisation is an event unique to angiosperms
(D) In angiosperms, each cell of an embryo sac is diploid
(E) In angiosperms, the zygote develops into an endosperm

Of the above statements

(a) (A), (B) and (D) alone are correct
(b) (A), (B) and (E) alone are correct
(c) (A), (B) and (C) alone are correct
(d) (B), (C) and (D) alone are correct
(e) (B), (C) and (E) alone are correct

Kerala PMT-2014

Ans. (c) : Wolffia is one of the smallest flowering plants on the earth and wolffia is an example for aquatic plants and resembles corn meal specks that float on water.

• In the angiosperms, the seeds are surrounded by one of two integuments which develop into a seed coat that is usually hard.

• Double fertilization is a characteristic feature of angiosperms. In this process of double fertilization both diploid zygote and triploid endosperm are formed. Double fertilization is complex process where out of two sperm cells, one fuses with the egg cell and the other fuses with two polar nuclei which result in a diploid (2n) zygote and a triploid (3n) primary endosperm nucleus respectively.

658. The angiosperm showing symbiotic association with blue green algae is

(a) lens (b) cyamopsis
(c) trifolium (d) none of these

Punjab MET-2011

Ans. (c) : Clover or trefoil are common names for plants of the genus trifolium, flowering plants in the lagume or pea family fabaceae originating in Europe. It shows symbiotic association with blue- green algae.
Cyamopsis is also a genus of family fabaceae in its unmodified form, this food additive is used as a thickener in a large variety of food products.

659. Dolichos lablab is a

(a) straggler (b) climber
(c) twiner (d) runner

Punjab MET-2011

Ans. (c) : Dolichos is a genus of legume family. These are herbs and shrubs growing upright sometimes with climbing stem or spreading prostrate upon the ground. They have woody rhizomes.

660. Why is vivipary an undesirable character for annual crop plants?

(a) It reduces the vigour of plant
(b) The seeds cannot be stored under normal conditions for the next season
(c) The seeds exhibit long dormancy
(d) It adversely affects the fertility of the plant

JIPMER-2007

Ans. (b) : Vivipary is an undesirable character for annual crop plants because the seeds cannot be stored under normal conditions for the next season. It adversely affects the fertility of the plants. It is defined as the precocious and continuous growth of the offspring when still attached to the maternal parent.

661. The ability of the venus flytrap to capture insects is due to

(a) chemical stimulation by the prey
(b) a passive process requiring no special ability on the part of the plant
(c) specialized "muscle-like" cells
(d) rapid turgor pressure changes

JIPMER-2007

Ans. (d) : The ability of the venus flytrap to capture insects is due to change in rapid turgor pressure. It does not have muscle cell and chemical secreted by different insects does not affect the working of insectivorous plants.

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662. Seeds possess spongy aril in

(a) Eichhornia (b) Potamogeton
(c) Sagittaria (d) Nymphaea

AP EAMCET-2007

Ans. (d) : Seeds possess spongy aril in Nymphaea. It is genus of hardy and tender aquatic plants in the family Nymphaeaceae.
The fruit dehisces by the swelling of mucilage surrounding the seeds.

663. Study the following lists.

List I	List II
(A) Ribbon-shaped leaves	**1. Calotropis**
(B) Shiny leaf surfaces	**2. Ceratophyllus**
(C) Swollen and spongy petiole	**3. Potamogeton**
(D) Dissected leaves	**4. Vallisneria**
	5. Eichhornia

The correct match is :

	A	B	C	D
(a)	3	4	1	2
(b)	4	1	5	2
(c)	5	1	2	3
(d)	4	2	5	3

AP EAMCET-2010

Ans. (b) : Vallisneria – It is a submerged plant that spread by runners and sometime forms all underwater meadows.
Calotropis – The leaves of ***Calotropis procera*** are said to be valuable as an antidote for snake bite, sinus fistula. The leave of ***Calotropis procera*** are also used to treat jaundice.
Eichhornia – Eichhornia, commonly called **water hyacinths** was a polyphyletic genus of the aquatic flowering plant family Pontederiaceae.
Dissected leave – Compound leaves have separate leaflet each having its own stalk petiole. Leaves may be double or triple dissected. May be entire or toothed lobbing shallow.

Match	
(a) Ribbon –Shaped leaves	Vallisneria
(b) Shiny leaf surfaces	Calotropis
(c) Swollen and Spongy petiole	Eichhornia
(d) Dissected leave	Ceratophyllus

664. Study the following lists.

List I	List II
(A) Heterophyllous Plant	**(i) Asparagus**
(B) Plant without root	**(ii) Wolffia**
(C) Plant with largest simple leaves	**(iii) Sagittaria**
(D) Plant with succulent roots	**(iv) Tribulus**
	(v) Victoria regia

The correct match is :

	A	B	C	D
(a)	3	2	5	1
(b)	3	4	2	1
(c)	1	5	3	2
(d)	3	1	2	5

AP EAMCET-2010

Ans. (a) : Sagittaria- Sagittaria is a heterophyllous plant. It is a perennial herb tall, with arrow-shaped, long leaves and white flower, buds, vintage line drawing or engraving illustration.
Wolffia- Wolffia species are free-floating thalli, green or yellow-green, and without roots. The flower is produced in a depression on the top surface of the plant body. It has one stamen and one pistil.
Victoria- ***Victoria amazonica*** is a species of flowering plant, the largest of the water lily family Nymphaeaceae. It is the national flower of Guyana.
Asparagus- Asparagus has succulent roots because the plant stores food in them making fleshy and helpful in perrenation. It is a fibrous vegetable that may support a healthy gut, as well as lower the blood pressure.

List I	List II
(A) Heterophyllous Plant	Sagittaria
(B) Plant without root	Wolffia
(C) Plant with largest simple leave	Victoria
(D) Plant with succulent root	Asparagus

665. The ratio of components of male flower of Smilax, female flower of *Ruscus*, modified reproductive shoots of *Scilla* and *Tephrosia* is.

(a) 4 : 3 : 5 : 7 (b) 7 : 5 : 4 : 3
(c) 7 : 3 : 5 : 4 (d) 4 : 7 : 5 : 4

AP EAMCET-2010

Ans. (c) : The ratio of components of male flower of smilax, female flower of Ruscus, modified reproductive shoots of scilla and Tephrosia is 7 : 3 : 5 : 4. The male flower have six stamens arranged in two whorls of three each. The female flowers have well developed pistils and remnants of anthers that are degenerated in the early developmental phases of flower bud.

666. Choose the group of plant belonging to xeropytes.

(a) Agave, Aloe, Sagittaria
(b) Calotropis, Casuarina, Helianthus
(c) Alfa-alfa, aloe, Ephedra
(d) Sonneratia, Casuarina, Agave

UP CPMT-2014

Ans. (c): xeropytes plants are a group of plants that are adapted to survive in arid regions like desert and snow-covered areas. It have stomata with microscopic opening and elongated leaves that store large amount of water. Alfa-alfa, aloe and ephedra belong to xerophytic plants.

667. Carnivorous plants are

(a) Autotrophic parasite and heterotrophic
(b) Parasite and behave as autotrophs
(c) Photoautotrophs and chemoautotrophs
(d) Autotrophs but show heterotrophic mode of nutrition

UP CPMT-2014

Ans. (d): Carnivore (insectivorous) plants are autotrophs plants. They perform process of photosynthesis. These plants usually grow in nitrogen deficient soil and capture insect to fulfill nitrogen deficiency. Therefore, show heterotrophic mode of nutrition.

668. During the process of microsporogenesis in angiosperms, how many tetrads are formed, from a single microspore?

(a) 1 (b) 2
(c) 8 (d) 4

UP CPMT-2014

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Ans. (a): During the process of microsporogenesis in angiosperms a single microspore forms one tetrads. Young microspore mother cell is (polygonal and are tightly packed) get loosely scattered due to increase in size of pollen grains sac. Microspore mother cell is a diploid cell in plants that divide by meiosis to give rise to 4 haploid cells.

669. Which one group of organism possess minimum number of chromosome?

(a) Brassica oleracea and Mucor hemolysis
(b) Carica papaya and Haplopappous gracilis
(c) Pisum sativum and Mucor hemolysis
(d) Haplopappus gracilies and Mucor hemolysis

UP CPMT-2014

Ans. (d): *Haplopappus gracilis* and *Mucor hemolysis* are angiospermic plant and a bread mould fungi respectively. These two organism possess minimum number of chromosome. In *Mucor hemolysis* n = 2 and in *Haplopappus gracilies* 2n = 4, *Carica papaya* and *Pisum sativum* contain 18 and 14 number of chromosomes respectively.

670. During the characteristic feature of angiosperm (double fertilization) one of the sperm fuses with egg cell and other sperm fuses with

(a) Another egg cell to form 3n tissue
(b) Nuclear cell to form 2n tissue
(c) Central cell to form triploid tissue
(d) Two nuclei to form diploid tissue

UP CPMT-2014

Ans. (c): In angiosperm fertilization is carried out by syngamy (fusion of egg cell with sperm or male nucleus) and another nucleus fuses with secondary nucleus (two polar nuclei or central cell) to form triploid tissue, endosperm. Thus, fertilization is completed in two steps, it is referred as double fertilization.

671. Assertion (A) True xerophytes store water in the form of mucilage which helps to withstand prolonged period of drought.
Reason (R) Vascular and mechanical tissues are well developed in true xerophytes.
The correct answer is

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) Only (A) is true, but (R) is not true
(d) (A) is not true but (R) is true

AP EAMCET-2009

Ans. (d) : Xerophytes are plant adapted to live in dry condition. Common leaf adaptation to reduce the rate of transpiration include; Thick waxy cuticle that act as a barrier to evaporation.
Sunken Stomata in pith in the epidermis trap moist air that reduces evaporation rate.
Xerophytes posses thick, waxy, cuticle, multilayered epidermis, well developed mechanical tissues because. They are exposed to winds. These mechanical tissues are composed of sclerenchyma or other lignified tissues in stem.

672. From evolutionary point of view, tracheids and sieve cells are more primitive than tracheae and sieve tubes respectively. The angiosperms have

(a) tracheae and sieve tubes
(b) tracheids, tracheae and sieve tubes
(c) tracheae, sieve cells and sieve tubes
(d) tracheids, tracheae and sieve cells

AP EAMCET-2009, 2011

Ans. (b) : In angiosperm, xylem consists of tracheids, vessels or tracheae, xylem fibre and xylem parenchyma. Sieve cells and tracheids are also primitive structure which are present in gymnosperms. Tracheae are absent in Pteridophytes and Gymnosperm.
In angiospermic phloem sieve elements are sieve tubes while, in gymnosperms and pteridophytes sieve cells are found.

673. Arrange the following in the order of their location from periphery to centre in the entire dicotyledonous plant body

(i) Fusiform cells
(ii) Trichoblasts
(iii) Collocytes
(iv) Tylosis
The correct sequence is

(a) (iv), (i), (ii), (iii)
(b) (ii), (iii), (i), (iv)
(c) (iii), (ii), (i), (iv)
(d) (i), (iv), (iii), (ii)

AP EAMCET-2009

Ans. (b) : The correct sequence of structures in order of their location from periphery to centre in a dicot is trichoblasts→ Collocytes→ Fusiform cell → Tyloses of both dicot root and dicot stem.
Fusiform cells are found in the vascular cambium of dicot root and stems.
Trichoblast present in the epidermis of root
Collocytes is present in the collenchymatous hypodermis a part of cortex.
Tylosis are balloon shaped structures present in the vessels of heart wood.

674. Which is correct regarding saprophytic angiosperm?

(a) They secrete enzyme outside the body and absorbes the nutrients.
(b) They have mycorrhiza with fungi
(c) They takes food and then digested it
(d) They are photosynthetic

UP CPMT-2006

Ans. (a) : Saprophytic organism break dead organic matters by secreting digestive enzymes and then absorb the nutrient molecules from dead organisms. They excrete hydrophytic enzyme into the external medium. These enzyme are cellulose, chitinase, amylase, proteinase etc. They hydrolyze different component for organic matter and then the simple and soluble substance are absorbed.

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675. Match the following lists

List I	List II
(A) Turrill	(i) Tissue culture
(B) Goethe	(ii) Pollen grains
(C) Salisbury	(iii) Nucleosome
(D) oudet	(iv) Flower- a modified stem
	(v) Stomatal index

The correct match is

	A	B	C	D
(a)	(iii)	(i)	(iv)	(v)
(b)	(v)	(ii)	(iii)	(iv)
(c)	(iv)	(i)	(ii)	(iii)
(d)	(ii)	(iv)	(v)	(iii)

AP EAMCET-2013

Ans. (d) :
(a) Turill - (ii). Pollen grains
(b) Goethe - (iv). Flower- a modified stem
(c) Salisbury - (v).Stomatal index
(d) Oudet - (iii). Nucleosome
The study of pollen grams and palynology, its classification and nomeclature was studied by Turill.
Flower is a modified shoot because it develops in the axils of bracts like axillary shoots and leaves are modified into the floral structures.
Stomatal index- It is the percentage of the number of stomata cells present to the total number of epidermal cells. Stomatal index is a term introduced by Salisbury in 1927.
Oudet studied the linker histone dependent DNA structure in a linar mononucleosome.

676. Halophytes are
(a) Fire resistant (b) Cold resistant
(c) Salt resistant (d) Sand loving

AMU-2009
CMC Vellore-2010

Ans. (c) : Halophytes are the plants which grow in saline condition or high salt concentration of generally $NaCl_2$, $MgCl_2$, $MgSO_4$ etc. These plants thus face physiological dryness.

677. Of the known flowering plants, the number of species of monocots is a partly
(a) 5000 (b) 50,000
(c) 5,00,000 (d) 555,00,000

AMU-1999

Ans. (b) : Monocotyledons commonly referred to as monocots are grass and flowering plants, the seeds of which typically contain only one embryonic leaf or cotyledon. The monocots include about 60,000 species. The largest family in this group by number of species are the orchids (family orchidacea) with more than 20,000 species.

678. Which of the following is an insectivorous plant?
(a) Nepenthes (b) Solarium
(c) Cuscuta (d) Asparagus

AMU-2001

Ans. (a) : Insectivorous plants are a special type of plants commonly called as carnivorus plants that drive their nutrition by feeding on insect and other organisms because they grow in the soil with low nitrogen content. Nepenthes (pitcher plant) is an example of insectivorous plants. Other insectivorous plants are venus fly trap and bladder wort.

679. Match the following with correct combination

	Column I		Column II
(A)	**Cuscuta**	**(1)**	**Saprophyte**
(B)	**Eichornia**	**(2)**	**Pneumatophore**
(C)	**Monotropa**	**(3)**	**Insectivorous plant**
(D)	**Rhizophora**	**(4)**	**Parasite**
(E)	**Utricularia**	**(5)**	**Root pocket**

(a) A-4, B-3, C-1, D-5, E-2
(b) A-4, B-5, C-1, D-2, E-3
(c) A-2, B-3, C-1, D-5, E-4
(d) A-3, B-1, C-5, D-4, E-2
(e) A-2, B-5, C-4, D-3, E-1

Kerala PMT-2008

Ans. (b) :

A.	Cuscuta	Parasite
B.	Eichornia	Root pocket
C.	Monotropa	Saprophyte
D.	Rhizophora	Pneumatophore
E.	Utricularia	Insectivorous plant

A. Cuscuta is parasite of higher plant commonly called as dodder or Amarbel.
B. Eichornia or water hyacinth belongs to the genus of aquatic flowering plants which develop root pocket to float freely in the water.
C. Monotropa is a herbaceous perennial plants which is saprophyte.
D. Rhizophora belongs to the mangrove vegetation with adaptations such as pneumatophore.
E. Utricularia or bladderworts is an insectivorous plant.

680. One of these is not related to dicots
(a) Two cotyledons
(b) Leaves reticulated
(c) Secondary growth
(d) Pollen with three furrows

UP CPMT-2013

Ans. (d) : Dicotyledonous plants are also called angiosperms. Its root develop from the radicle and seed has two cotyledons. Their leaves have reticulate venation. Secondary growth is present in the dicot plant which occur with the help of vascular cambium and phellogen but they are not related to pollen with three furrows.

681. Utricularia grows in
(a) evergreen forests
(b) lakes and ponds as submerged hydrophyte
(c) bog as a marsh plant
(d) tropical deciduous forest

Uttarakhand PMT-2011

Ans. (b) : Utricularia grows in lakes and ponds as submerged floating hydrophytes. These plants remain under water completely and none of them have true roots. These can be grown in containers as house plants. It is carnivorous plants.

682. Choose the correct match
Bladderwort, sundew, venus flytrap : -
(a) Nepanthese, Dionaea, Drosera
(b) Nepanthese, Utricularia, Vanda
(c) Utricularia, Drosera, Dionaea
(d) Dionaea, Trapa, Vanda

AIPMT-2002

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Ans. (c) : Scientific Name of bladderwort is Utricularia
Scientific Name of sundew is Drosera
Scientific Name of venus flytrap is Dionaea
It can be seen as exemplars of key traits genetically associated with carnivory i.e. trap leaf development, prey digestion and nutrient absorption.

683. Read the following lists.

List-I	List-II
(A) Extra foliar nectaries	**1. Achras**
(B) Schizogenous cavities	**2. Tropaeolum**
(C) Laticiferous ducts	**3. Passiflora**
(D) Hydathodes	**4. Eucalyptus**
	5. Pinus

	A	B	C	D
(a)	3	1	2	4
(b)	2	1	3	4
(c)	3	5	1	2
(d)	5	2	1	3

AP EAMCET-2008

Ans. (c) :
(a) Extra foliar Nectaries - Passiflora
(b) Schizogenous cavities - Pinus
(c) Laticiferous ducts - Achras
(d) Hydathodes - Tropaeolum

684. Read the following lists

List-I	List-II
(A) Gall flowers	**1. Theobroma**
(B) Sympodial axis	**2. Bougainvillea**
(C) Achlamydeous	**3. Ficus**
(D) Cauliflory	**4. Euphorbia**
	5. Hamelia

	A	B	C	D
(a)	3	5	1	2
(b)	3	4	2	1
(c)	3	4	1	2
(d)	3	5	4	1

AP EAMCET-2008

Ans. (d) : Gall flowers - Ficus
Sympodial axis - Hamelia
Achlamydeous - Euphorbia
Cauliflory - Theobroma

685. Study the following table

i.	Peperomia	Leaf succulent	Leaf epidermal cells store water
ii.	Calotropis	Non-succulent	Root with thickened cell walls
iii.	Tribulus	Ephemeral	Stem stores water
iv.	Ammophila	Dicot plant	Rolling in of leaves to check water loss

Identify the correct pair of answers.
(a) i, ii (b) i, iii
(c) ii, iii (d) ii, iv

AP EAMCET-2008

Ans. (a) : Peperomia – Peperomia are small plants which are similar to hoyas in their care. Both are succulent like with fleshy leaves and stems. Peperomia are commonly referred to as radiator plant and baby rubber plants. It occurs in all tropical and subtropical regions of the world.
(b) Calotropis – Calotropis is a genus of flowering plants in the family Apocynaceae, first described as a genus in 1810.
Calotropis has thick leaf but non-succulent but has thick cell wall in the root cells.

686. Match the following column-I with column-II.

Column-I	Column-II
A. Agrostology	1. Earth
B. Smallest flowering plant	2. Genetic engineering
C. Tectonic	3. Migration
D. Ecesis	4. Wolffia
E. Euphenics	5. Grass

	A	B	C	D	E
(a)	5	4	1	3	2
(b)	1	2	3	4	5
(c)	2	3	1	5	4
(d)	4	2	2	1	3

AIIMS-2015

Ans. (a) :

A.	Agrostology	1.	Grass
B.	Smallest flowering plant	2.	wolffia
C.	Tectonic	3.	Earth
D.	Ecesis	4.	Migration
E.	Euphenics	5.	Genetic engineering

687. Shock movement in touch me not plant is
(a) seismonasty (b) photonasty
(c) chemonasty (d) thermonasty

Punjab MET-2008

Ans. (a) : Shock movement in "touch me not plant" is seismonasty. It is due to the change in turgidity eg. Mimosa pudica. The leaf of Mimosa is compound having four pinna and each pinna is having pinnules. If a terminal pinnule is touched, the whole leaf droops down. This is due to fact that at the bases of pinnules, pinna and whole leaf, swollen structure called, pulvinus is present and drooping is due to loss of turgidity of lower portion of pulvinus.

688. Interxylary as well as intraxylary phloem is present in
(a) Bignonia (b) Mirabilis
(c) Strychnos (d) Achyranthes

Punjab MET-2007

Ans. (c) : In Strychnos bredemeyeri small segments of the cambium cease to produce secondary xylem temporarily and produce more phloem centrifugally. A new segment of the cambium differentiates outside to this phloem, which unite with the regular cylinder to form a complete ring by leaving the cambium segment in the furrow. Such repeated activity of cambium results in inclusion of phloem islands within the secondary xylem called intraxylary phloem. Beside interxylary phloem, intraxylary phloem is added from the marginal pith cells.

689. Identify the pair of wrong statements from the following
(I) Branches of limited growth in Asparagus perform photosynthesis.
(II) petiole of Australian Acacia helps in climbing
(III) Floral bud of Agave store food materials

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(IV) Aerial roots of Taeniophyllum helps in vegetative propagation.

(a) I, IV (b) I, II
(c) III, IV (d) II, IV

AP EAMCET-2016

Ans. (d) :
(ii) Petiole of Australian Acacia helps in photosynthesis because petiole is modified into leaf like structure called phyllode which performs the function of synthesis of food.
(iv) The aerial roots Taeniophyllum orchids have velamen tissue which absorb moisture from the air.

690. The branch of biology that deals with study of grasses is known as

(a) anatomy (b) agrostology
(c) anthology (d) agronomy
(e) ecology

CMC Vellore-2015

Ans. (b) : The branch of biology that deals with the study of grasses is known as Agrostology.
• Anatomy is the science that studies the structure of the body.
• Anthology is the study of flowers and flowering plants. Anthos means a flower and logia means collection.
• Agronomy is a branch of agriculture dealing with the field crop production and soil management.
• Ecology is the study of organism, and how they interact with the environment around them.

691. The most common type of ovule in angiosperms is

(a) amphitropous (b) atropous
(c) anatropous (d) circinotropous

Punjab MET-2009

Ans. (c) : The most common type of ovule is the anatropous ovule found in angiosperm. An ovule is a small body that contains the female germs cells of a plant.
• An anatropous ovule is one in which curvature during development results in displacement of the micropyle to a position adjacent to the funiculus base.

692. The most thoroughly studied of the known bacteria-plant interactions is the

(a) cyanobacterial symbiosis with some aquatic ferns
(b) gall formation on certain angiosperms by Agrobacterium
(c) nodulation of Sesbania stems by nitrogen fixing bacteria
(d) plant growth stimulation by phosphate solubilizing bacteria

Manipal-2007

Ans. (b) : There are several types of plant microbe interactions such as, competition, Commensalism, Mutualism, Parasitism.
Plants and bacteria do interact with one another in a variety of ways. The agrobacterium crown gall phenomenon is to date the most thoroughly studied and best documented of the known bacteria-plant interactions. This bacterium contains a large Ti plasmid which is extensively used as natural genetic engineer in plant genetic engineering.

693. Rarely among angiosperms the pollen grains influenced the endosperm. This is called as

(a) metaxenia
(b) nemec phenomenon
(c) xenia
(d) mesogamy

UP CPMT-2004

Ans. (c) : The classical example of pollen grain influence of endosperm can be seen in maize commonly known as mays. The transfer of character by a male gametes and its influence on endosperm is known as xenia.
• The term xenia was originally coined to refer direct effect of pollens on seed and fruit characters or effect of gene from male parent on development of fruit and seed.

694. Which of the following is a saprophytic angiosperm?

(a) Agaricus (b) Cuscuta
(c) Neottia (d) Eucalyptus

AFMC-2000

Ans. (c) : The plants belonging to genus Neottia lack leaves and chlorophyll and obtain their nutrition from fungi or by Saprophytic nutrition.
• Saprophytes cannot produce their own food as autotrophs, where as heterotrophs cannot produce or manufacture their own food.

695. A plant which lives on another plant but do not take food or anything from plant is called:

(a) endophyte (b) epiphyte
(c) parasite (d) host

AFMC-2005

Ans. (b) : Epiphytes are those plants which are attached to another plant but do not grow parasitically upon it merely uses it for support.
• Epiphytes have no attachment to the ground or other obvious nutrient source and are not parasitic on the supporting plants.
Example- Orchids, mosses etc.

696. The ploidy of the pollen grain in Cyperus is:

(a) 4n (b) 3n
(c) 2n (d) n

BHU PMT-2003

Ans. (d) : The ploidy of the pollen grain in cyperus is haploid (n). Pollen grains are sperm producing structure therefore represent the male gametophyte or microgametophyte.

697. In Ficus inflorescence is :

(a) hypanthodium (b) cymose
(c) raceme (d) none of these

Punjab MET-2003

Ans. (a) : The specialized inflorescence in ficus is called Hypanthodium. The receptacle is fleshy and forms a hollow ball-like structure having an opening in hypanthodium.
• An important characteristics feature of figs is their unique style of inflorescence.
• Ficus forms a large group of woody plants called fig trees or figs.

698. In CAM plants :

(a) stomata open in day and close at night
(b) stomata remain open in day and night both

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(c) stomata remain closed in day and night both
(d) stomata open at night and close in day

Rajasthan PMT-2009 / JIPMER-2004
Punjab MET-2003

Ans. (d) : In plant using full CAM, the stomata in the leaves remains closed during the day to reduce evapotranspiration, but open at night and close in day. It collects the CO_2 in night.

- CAM (crassulacean acid metabolism) also known as CAM Photosynthesis, is a carbon fixation pathway that evolved in some plants as an adaptation to arid condition.

699. The Orobanche plant is:
(a) partial stem parasite (b) total root parasite
(c) symbiont (d) total stem parasite

Punjab MET-2003

Ans. (b) : Orobanche is a root parasite, commonly known as broomrape, is a genus of over 200 species of small parasitic herbaceous plants.
Most of the plants are autotrophic. However some plants are heterotrophs and obtain their nutrition parasites and saprotrophs.

- It attaches to the root of the plants and absorb water from plant and nutrition. Example- Rafflesia and Cuscuta.

700. How many cells are present in female gametophyte of Capsella just before fertilization?
(a) 2 (b) 3
(c) 5 (d) 7

Rajasthan PMT-1996

Ans. (d) : The female gametophyte develops from a single functional megaspore. The megaspore undergoes many mitotic divisions to form 7-cells.

- In the female ovule, among four meiotic products only one megaspore cell survives and undergoes three synctial divisions producing the embryo sac with 7-8 nuclei.

701. Vivipary is present in:
(a) Peepal (b) Neem
(c) Rhizophora (d) Jamoon

J&K CET-2009
Rajasthan PMT-1996

Ans. (c) : Plant vivipary is the process of giving birth to young seedlings in advanced stages of development. It is a special type of seeds germination occurring in plants growing in sea cost and salt lakes like Rhizophora, Sonneratia and Heritiera.

- Vivipary is the condition where the embryo (the young plant within the seed) grows first to break through the seed coat then out of the fruit wall while still attached to the parent plant.

702. How many cells are present in mature male gametophyte capsella?
(a) 1 (b) 2
(c) 3 (d) 4

Rajasthan PMT-1996

Ans. (c) : Three cells are present in mature male gametophyte capsella. In some species of angiosperms, the generative cells divides to form two male gametes before pollination and the mature pollen is released at the 3- celled stage.

703. How many male nuclei takes part in double fertilization of capsella?
(a) 1 (b) 2
(c) 3 (d) 5

Rajasthan PMT-1996

Ans. (b) : Three male nuclei takes part in double fertilization of capsella. It is a fusion of two male gametes brought by a pollen tube to two different cells of the same female gametophyte to form zygote and endosperm.

704. CAM plants ecologically comes under which of the following category?
(a) Succulent plants (b) Mangrove plants
(c) Halophytes (d) None of these

Rajasthan PMT-1996

Ans. (a) : Succulent plants grow in habitats with less or no water. They store H_2O whenever it is available.
They have succulent & fleshy organs like stems, leaves & roots which serve as H_2O storage organs and accumulate large amounts of water during the brief rainy seasons, For example - Opuntia.

705. Cuscuta is a
(a) parasitic plant (b) symbiotic plant
(c) predator (d) decomposer

UP CPMT-2003
AIPMT-2002
BVP-2000

Ans. (a) : Cuscuta is a parasitic plant. It has no chlorophyll and can not make it own food by photosynthesis. They are also called as holo parasite

706. Angiosperms differ from gymnosperms in
(a) seeds
(b) fruits
(c) male gametophyte
(d) female gametophyte

UP CPMT-2003

Ans. (b) : Angiosperms differ from gymnosperms in fruit. It is also flowering plants, angiosperms have seeds that are enclosed within an ovary.
Gymnosperms have no flowers or fruits and have unenclosed seeds on the surface of scales or leaves. The seed of angiosperms develop in the ovaries of flowers and are surrounded by a protective fruit.

707. A material which arrests cell division, is obtained from
(a) Crocus (b) Colchicum
(c) Dalbergia (d) Chrysanthemum

Uttarakhand PMT-2007

Ans. (b) : Colchicine is a chemical that is derived from the corms of a plant called colchicum. This can cause somatic doubling, which means that the number of chromosomes in a cell can double.

708. Leucaena leucocephala is
(a) A small leguminous tree with edible fruits and seeds.
(b) A fodder plant as its pods and leaves are consumed by cattle
(c) Called subabul in India
(d) All of the above

VMMC-2013

@apna_pdf

Ans. (d) : Leucaena leucocephale (wild Tamarind) is a small fast growing mimosoid tree. They are evergreen shrub or tree with fairly open, rounded crown. It can grow upto 5 to 20 meter tall. They are small leguminous tree with edible fruit and seeds. Its pods and leaves are consumed by the cattle and generally known as subabul in India.

709. Coconut fruit is dispersed by

(a) man (b) wind
(c) birds (d) water

Manipal-2011

Ans. (d) : Coconut fruit is dispersed by water. Cocos nucifera commonly known as coconut palm comes in the family of Arecaceae. The seeds have spongy or fibrous outer coat which float on water. It becomes light in weight in water and it is able to cover a large distance.

710. Haustorial root is exceptional to

(a) Zea mays (b) cactus
(c) Cuscuta (d) Monotropa

AFMC -2011

Ans. (c) : Cuscuta is a parasite plant because it is a leafless plant with yellow stem. It can not synthesis its own food due to the absence of chlorophyll. Haustorial root is exceptional to cuscuta.

711. According to engler and prantl system the

(a) Angiosperms are placed before gymnospenns
(b) Dicots are placed before monocots
(c) Monocots are placed before dicots
(d) Archichlamydeae is placed before dicots

BHU PMT (Mains)-2011

Ans. (c) : According to engler and prantl system the monocots are placed before dicots. From various groups of gymnosperms, Angiosperms are evolved monocots and then dicots. From angiosperms 1st evolved monocots and then dicots. It means that dicots are advanced whereas monocots are primitive.

712. Figs belong to

(a) critical link species, as they form connecting link between trees and herbs
(b) critical link species, as they establish essential link in the absorbance of nutrients from soil and organic residues.
(c) keystone species, as they produce large quantity of fruits; and their protection leads to conservation of animals dependent on them
(d) keystone species, as they have high degree of animal-dependent pollination

DUMET-2010

Ans. (c) : Figs represent keystone species because they produce large quantity of fruits; and their protection leads to conservation of animals dependent on them.

713. Vegetative fertilization is also called

(a) triple fusion
(b) true fertilization
(c) syngamy
(d) generative fertilization

J&K CET-2009

Ans. (a) : Vegetative fertilization is also called triple fusion. It involves the fusion of second male gamete with two polar nuclei or their fusion product. As a consequence, a triploid primary endosperm nucleus develops, splits and produces triploid endosperm.

714. During the process of sexual reproduction in flowering plants, double fertilization involves

(a) fertilization of egg cell by two male gametes
(b) fertilization of egg cell and a central cell by two male gametes brought by same pollen tube
(c) fertilization of egg cell and a central cell by two male gametes brought by different-pollen tube
(d) fertilization of two egg cells by two male gametes brought by same pollen tube

J&K CET-2014

Ans. (b) : During the process of sexual reproduction in flowering plants, double fertilization involves fertilization of egg cell and a central cell by two male gametes brought by same pollen tube. Triploid endosperm nuclei are created when two polar nuclei fuse with haploid sperm.

715. Consider the following statements with respect to angiosperms

(A) The male sex organ in a flower is the stamen
(B) The anthers following mitosis produce pollen grains
(C) In an embryo sac, the primary endosperm nucleus (PEN) is diploid
(D) After double fertilization the ovules develop into seeds and ovaries develop into fruit

Of the above statement

(a) C and D are correct (b) A and B are correct
(c) A and C are correct (d) A and D are correct
(e) B and C are correct

Kerala PMT-2015

Ans. (d) : The male sex organ in a flower is called stamen and after double fertilization the ovules develop into seeds and ovaries develop into fruit. The PEN is triploid and is formed by the process of triple fusion. The pollens are produced by meiosis. Hence, statement A & D are correct with respect to angiosperms.

716. The fleshy receptacle of syconous of fig encloses a number of

(a) achenes (b) samaras
(c) berries (d) mericarps

BHU PMT (Screening)-2010

Ans. (a) : The fleshy receptacle of syconous of fig encloses a number achenes. A syconium is the type of inflorescence borne by figs (genus ficus) formed by an enlarged, fleshy, hollow receptacle with multiple ovaries on the inside surface. A multitude of achenes which are produced by the development of female flowers into achenes inside the inflorescence's closed receptacle, are produced.

717. Grafting is successful in dicots but not in monocots because the dicots have

(a) vascular bundles arranged in a ring
(b) cambium for secondary growth
(c) vessels with elements arranged end to end
(d) cork cambium

Rajasthan PMT-2010

Ans. (b) : Grafting is successful in dicots but not in monocots because the dicots have cambium for secondary growth. Cambium have the capacity to form secondary xylem and pholem. It is present in dicots and absent in monocots.

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718. In CAM plants, CO_2 acceptor is
(a) RuBP (b) PEP
(c) OAA (d) PGA
MGIMS Wardha-2008

Ans. (b) : In CAM plants, CO_2 acceptor is phosphoenol pyruvic acid (PEP) during night while ribulose bisphosphate is CO_2 acceptor during day time.

719. In Gloriosa, the tendrillar part is formed by
(a) stipule (b) leaf apex
(c) leaf petiole (d) axillary bud
AMU-2011

Ans. (b) : In Gloriosa, the tendrillar part is formed by leaf apex. Leaf apex in the tip of the leaf which can vary in shapes and sizes in different plants.

720. The wood used for making musical instruments as xylophone is
(a) Dalbergia (b) Tactona
(c) Plywood (d) Santalum
AMU-2011

Ans. (a) : The wood used for making musical instruments as xylophone is the Dalbergia. It is Indian rose wood. It consists of a frame of wood pitched bars which rests on a metal stand which has wheels for ease transport. These bars are made of Rose wood.

721. The component of cell wall of the vessel of an angiospenn is a complex compound of
(a) glucose (b) galacmronic acid
(c) coniferyl alcohol (d) chitin
AMU-2011

Ans. (c) : The component of cell wall of the vessel of an angiospenn is a complex compound of coniferyl alcohol. The component of cell wall of the vessel of an angiosperm is a complex compound of coniferyl alcohol.

722. Which one of the following is matched incorrectly?
(a) Pinus Coralloid roots
(b) Sequoia Tap roots
(c) Cycos Unbranched stem
(d) Cedrus Branched stem
AMU-2010

Ans. (a) : The coralloid roots are found in cycadophytes. The caralloid roots contain symbiotic cyanobacteria (blue-green algae), which fix nitrogen and in association with root tissues and form beneficial amino acids, for example:- asparagine.

723. If an angiospermic plant produces unisexual and bisexual flowers on the same plant, the condition would be termed as
(a) Dioecious (b) Trioecious
(c) Polygamous (d) Andro-gynoecious
AMU -2000

Ans. (c) : If an angiospermic plant producs unisexual and bisexual flowers on the same plant, the condition is termed as polygamous. For example, Mango.

724. Which of the following plant yields oil and fibre both ?
(a) *Cocos nucifera* (b) *Eucalyptus*
(c) *Brassica campestris* (d) *Euphorbia hirta*
MGIMS Wardha-2004

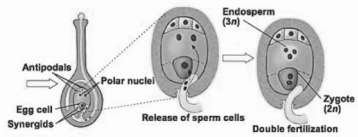
Ans. (a) : The *Cosos nucifera* or the coconut tree is a member of the palm family (Arecaceae family). The coconut term can refer to the entire coconut palm, the seed, the fruit which is botanically a drupe, not a nut. It yields both oil and fibre. The coconut oil is used as cooking oil as well as hair oil.

725. Cuscuta which climbs up the support with help of loop formation around the support. This type of movement is called:
(a) nutation
(b) nastic movement
(c) hygroscopic movement
(d) none of the above
VMMC-2006

Ans. (a) : Nutation, often called circumnutation, is a particular class of nastic movements, in which the plant organ successively bends in different directions, resulting in an apparent oscillatory swinging motion. Cuscuta plant is called a parasite.

726. Double fertilisation occurs among
(a) algae (b) bryophytes
(c) angiosperms (d) gymnosperms
UP CPMT-2008
BCECE-2007

Ans. (c) : Double Fertilisation is a process unique to angiosperm. The double fertilization is exhibited by angiosperms. Double fertilization is a process in which one of the male gamete fuses with the female egg and the other male gamete fuses with the two polar nuclei. Double fertilization includes both syngamy and triple fusion.



727. The endosperm found in angiospermic seed is different from that of gymnosperm in the sense that in the former
(a) it is formed before fertilisation while latter is formed after fertilization
(b) it is formed after fertilisation while letter is formed before fertilization
(c) it is cellular while latter is nuclear
(d) it is nutritive while latter is protective
Manipal-2015
Rajasthan PMT-2001

Ans. (b) : The gymnosperms are non-flowering plants that have naked seeds on the surface of scales or leaves whereas angiosperms are the flowering plants which have seeds that are encased inside an ovary. The endosperm found in the angiosperm seed is formed after fertilization or during triploid fusion while the endosperm is formed before fertilization in case of the gymnosperm. The endosperm is gymnosperms in pre fertilization tissue and haploid in nature but in angiosperms it is post fertilisation tissue and generally triploid in nature.

728. If the diploid number of an angiospermic plant is 24, the number of chromosomes in pollen grain, endosperm and integument will be
(a) 12, 36, 12 (b) 12, 24, 36
(c) 12, 12, 36 (d) 12, 36, 24
Manipal-2015

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Ans. (d) : • The pollen grains are haploid in nature, so, No. of chromosome in pollen grain is-

$2n = 24$

$n = \frac{24}{2} = 12$

Endosperm is polyploidy, so it's going to have 3n chromosomes.

$n = 12$

$3n = 3 \times 12 = 36$

Integoment is diploid in nature, therefore, it is going to have 2n chromosomes,

$n = 12$

$2n = 2 \times 12 = 24$

Hence, Pollen grain, endosperm and integument will be 12, 36 and 24 respectively.

729. Female gametophyte of angiosperm consist of egg cell, synergids antipodal cell and central cell. Out of them egg apparatus consist

(a) two synergids and one egg cell
(b) three synergids cells
(c) antipodal cells and egg cell
(d) a nucleus and two antipodal cells

VMMC-2014

Ans. (a) : The egg apparatus of female gametophyte of angiosperm is three celled structures. It consists of one egg cell and two synergids on either side of egg cell. Three antipodal cells are present on chalazal side. The central cell (secondary nucleus) is binucleate and is present in centre of embryo sac (female gametophyte).

730. Eustele is present in :

(a) algae (b) dicots
(c) bryophytes (d) pteridophytes

JIPMER-2000

Ans. (b) : Eustele is a type of dissected siphonostele in which vascular cylinder appears in a ring of collateral or bicollateral vascular bundles separated by medullary rays e.g., Dicot stem, which referes to the typical features of the group, namely that the seed has two embryonic leaves or cotyledons.

731. Number of meiotic divisions necessary to produce 100 seeds in cyperus is

(a) 100 (b) 200
(c) 300 (d) 100

Manipal-2013

Ans. (b) : One microspore mother cell in the cyperaceae family generates just one pollen grain (Microspore), since the other 3 microspores degenerate. For the formation of 100 seeds, 100 egg cells and 100 pollen grains are required.

Therefore, the total number of meiotic division required to produce 100 seeds in Cyperus = No. of divisions required for egg cell + No. of divisions required for pollen grains = 100 + 100 = 200.

732. Consider the following statements associated with the germination of an angiospermous seed

(1) as the seed gets hydrated and germinates, enzymatic activity is increased

(2) the respiration rate of the germinal-seeds increases along with the increased enzymatic activity

(3) the increase in the respiratory rate continues till senescence

(4) rate of enzymatic activity decreases

(a) 1, 2 and 3 are correct.
(b) 1 and 2 are correct.
(c) 2 and 4 are correct.
(d) 1 and 3 are correct.

BHU PMT (Mains)-2008, 2006

Ans. (b) : The germination of an angiospermous seeds are associated with the following statements, as the seeds get hydrated and germinates, enzymatic activity is increased. The respiration rate of the germinating seed increases along with the increased enzymatic activity.

733. Triple fusion in angiosperm is the fusion of second sperm with

(a) Antipodal cell and one synergid cell
(b) Two antipodal cells
(c) Two synergid cells
(d) Two polar nuclei

AMU-2009

Ans. (d) : In Angiosperm, fertilization involves two important events- Syngamy and triple fusion. The triple fusion is a characteristic feature in angiosperms where the sperm nucleus fuses with the secondary polar nuclei in the embryo sac. After pollination the pollen tube in formed carrying male gametes that move toward the egg cell one of them fuses with it by completing syngany.

734. Tallest angiosperm is:

(a) Eucalyptus (b) red wood tree
(c) oak tree (d) Pinus

AFMC-2004

Ans. (a) : *Eucalyptus regnans* (375 ft.) is the tallest angiosperm. It is the tallest blooming plant and perhaps the tallest tree on the planet. The vast majority of these trees are quick cultivators,arriving at statutes of around 30 to 180 feet or more.

735. A normal angiosperm embyo sac at the final stage of development has

(a) 4 nuclei (b) 8 nuclei
(c) 3 nuclei (d) 7 nuclei

CG PMT-2006

Ans. (b) : In angiosperms, the ovule contains an embryo sac (female gametophyte) which is formed from a megaspore. The mature embryo sac has three cells called antipodals at the chalazal end and three cells at micropylar and constituting the egg apparatus. Each of these cells consists nuclei. The egg apparatus consists of two synegids and one egg cell. There is large central cell Present which consists of two polar nuclei. Hence, embryo sac has 7 cells and eight nuclei.

The poolen tube ultimatly enters an ovule throught the micropyle and penetrates one of the sterile cells on either side of the egg.

736. Angiosperms differs from gymnosperms because

(a) embryo is present in it
(b) tissue is present in it
(c) vessel is present in its xylem
(d) None of the above

CG PMT-2006

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Ans. (c) : Angiosperms differ from gymnosperms in having specialized structures to cover seeds and have cells in the xylem. In angiosperm, there is presence of xylem vessels while xylem tracheids are present in gymnosperm.

737. An example of a parasitic plant which is strictly epiphytic is
(a) Cuscuta (b) Viscum
(c) Orobanche (d) Rafflesia

BHU PMT (Screening)-2011

Ans. (b) : Parasitic plants are the one which cannot prepare their own food, so the depend on the other plants for the food, to derive it plants, so for that they invade their stem or roots of the plants, they obtain nutrition and water both. Viscum is a common example of partial stem parasites, which grow as parasitic epiphytes on host plants. But it can carry out photosynthesis and manufacture their own food.

738. Which of the following is a rootless aquatic plant, in which a portion of the leaf forms a tiny sac for trapping insects?
(a) Nepenthes (b) Drosera
(c) Utricularia (d) Dionaea

DUMET-2009

Ans. (c) : The rootless aquatic plant named Utricularia that belongs to the genus bladderworts is a carnivorous aquatic plant. Utricularia or bladderwort is an insectivorous submerged aquatic plant in which the rootless floating stem bears highly dissected leaves. Some of the segmented leaves are modified to form bladders. Small insects flow into the bladder with water, but cannot come out due to the valve.

739. If Gnetum is not in flowering it may be mistaken for a
(a) tree fern (b) monocot plant
(c) dicot plant (d) None of these

CG PMT-2011

Ans. (c) : Flowers are the reproductive structures of plants that bear male and female gamets. The Gnetum is easily mistaken for a dicot plant unless it is in flowering or fruiting stage. The plant body is differentiated into root, stem and leaves. Ephedra and welwitschia of gnetales group are does not belongs to dicot angiosperm.

740. In embryo, cleavage brings about
(a) increased size
(b) increased DNA content
(c) change in shape and size
(d) increased mass of protoplasm

CG PMT-2011

Ans. (b) : During cleavage, there is no growth. However, repeated divisions result in an increase in DNA content. It is the process of division of a unicellular zygote into a multicellular embryo. It brings about the distribution of the cytoplasm of the zygote, amongst the blastomeres.

741. Monocots and dicots are the two main classes to
(a) fungi (b) angiosperm
(c) gymnosperm (d) protest

CMC Ludhiana -2013

Ans. (b) : In the late 1990 the most plant taxonomist divide angiosperm into two main clases- monocots and dicots. The monocots have one cotyledons while dicots have two cotyledons.

742. In which of the following features, Cycas resembles with angiosperms?
(a) Presence of vessels
(b) Circinate vernation
(c) Dichotomously branched leaves
(d) Pollen tube is the carrier of male gametes

BCECE-2008

Ans. (d) : Due to the existence of siphonogamy, in which male gametes are transferred to female gametes via a pollen tube, cycas, mimics angiosperms. Vessels are present in xylem of angiosperm while absent in Cycas (gymnosperm). The young leaves of Cycas are circinately folded as the those of fern but the angiospermic leaves are not circinately folded.

743. Water translocation in angiosperms is done by
(a) Sieve cells (b) Sieve tube elements
(c) Xylem vessel system (d) Xylem and phloem

AIPMT-1990

Ans. (c) : Water translocation is done in angiosperm (vascular plant) by xylem vessels and trachied from the root to the leaf. Continuous transpiration is cause of movement of water in xylem vessels upward side. It is raw material of plant for photosynthesis.

744. Which of the following is the result of double fertilization ?
(a) Cotyledon (b) Nucellus
(c) Endosperm (d) None of these

Punjab MET-2006

Ans. (c) : Double fertilization present in flowering plant is a result of sexual reproduction in which two male gametophyte i.e. generative nucleus and vegetative nucleus are fused with egg cells and polar nuclei. Fertilization of one male gamete with polar body (nuclei) endosperm is formed which is triploid in nature.

745. Respiratory roots in halophytes are positively
(a) Phototropic (b) Aerotropic
(c) Rheotropic (d) Geotropic

BVP-2014

Ans. (b) : The growth movement in response to air is called aerotropism. In halophytes, such as mangrove tress, there are respiratory roots called pneumatophores. These roots facilitate geseous exchange in marshy land.

746. A example of CAM plant is
(a) black night shade (Solanum nigrum)
(b) lemon grass (Cymbopagon flexuosus)
(c) sugarbeet (Beta vulgaris)
(d) snake plant (Sansevieria trifasciata)

AMU-2015

Ans. (d) : Snake plant is as example of CAM plant. In day time, they close their stomata to save water and at night they open up and store CO_2 in the form of an organic acid. Snake plant use the CAM process of photosynthesis.

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747. Number of chromosomes in an angiospermic plant is 14, then the number of chromosomes in synergid cells will be

(a) 14 (b) 7
(c) 28 (d) 21

JIPMER-2008

Ans. (b) : Angiospermic plants are diploid in nature. Synergids are part of female gametophyte and are haploid in nature. Thus, if the angiosperms plant cell has 2n = 14, synergies will have n = 7. because it develops by reductional division.

748. Pair the species with the type of wood:

Species		Type of wood	
(A)	**Tectona grandis**	**(1)**	**Soft wood**
(B)	**Cedrus deodara**	**(2)**	**Hard wood**
(C)	**Shorea robusta**		
(D)	**Dalbergia sisso**		

The correct pairing is:

(a) A-1 B-2 C-2 D-1
(b) A-1 B-1 C- 2 D-2
(c) A-2 B-1 C-2 D-2
(d) A-2 B-1 C-1 D-2

J&K CET-2003

Ans. (c) : Tectona grandis is a tropical hardwood tree species in the family lamiaceae.

- Cedrus deodara has softwood belongs to family Pinaceae.
- In Shorea robusta hardwood present. It is a species of tree in the family Dipterocarpaceae.
- In Dalbergia sisso hardwood present. It is a fast-growing, hardy, deciduoues rosewood tree native to Indian subcontinent & southern Iran.

749. Muehlenbeckia belongs to this category:

(a) xerophyte
(b) epiphyte
(c) mesophyte
(d) hydrophyte

AP EAMCET-2000

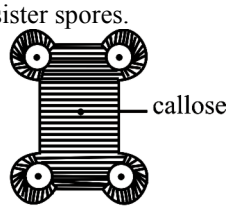
Ans. (a) : Muchlenbeckia is a xerophyte. These xerophytic plants can survive in Physiologically dry conditions. They need very little water. Such plants have adaptations to survive in an environment with little water.

750. In Angiosperm all the four microspores of tetrad are covered by a layer which is formed by : -

(a) Pectocellulose
(b) Callose
(c) Cellulose
(d) Sporopollenin

AIPMT-2002

Ans. (b) : Callose is involved at multiple stages of pollen developments as a structural component. Callose wall surrounds the sporocytes during the meiotic stage. It provides an isolation barrier sealing off one meiotic cell (megaspore mother cell) from another. Hence, it acts as a molecular filter isolating the developing microspores form the influence of the surrounding diploid tissue or sister spores.



Microspore tetrad
(mein 4 microspore)

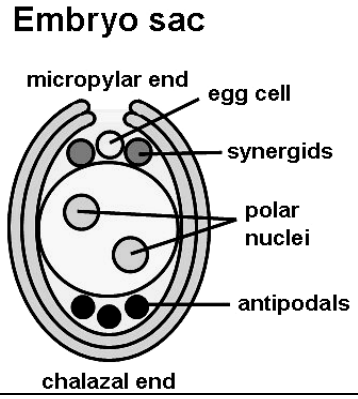
751. In Angiosperms pollen tube liberate their male gametes into the :-

(a) Central cell
(b) Antipodal cells
(c) Egg cell
(d) Synergids

AIPMT-2002

Ans. (d) : In Angiosperms pollen tube enter into synergids through filiform apperatus.

- The pollen tube discharged two male gametes.
- 1st fused with egg cell and fused with polar nuclei, they fused simultaneously called **double fertilization**.



752. How many nuclei take part in double fertilization of flowering plants?

(a) 3 (b) 2
(c) 5 (d) 8

GUJCET-2011

Ans. (c) : • Double fertilization is an event unique to angiosperms in involves fusion of one male gamete (hoplaid) with egg (hoplaid) to form zygote (diploid) that gives rise to embryo accompained with fusion of other male gamete (haploid) with two polar nuclei (Secondary nucleus) to form primary endosperm nucleus (PEN) that gives rise to a nutrivite tissue called endosperm.

- Hence total of 5 haploid nuclei are involved in double fertilization process.

753. A piece of wood having no vessels belongs to

(a) teak (b) mango
(c) Pine (d) palm

Assam CEE-2014

Ans. (c) : A piece of wood naring no vessels belong to pine because pine is Gymnosperm (Non flowering plant), and Gymnosperms are devoid of vessels instead tracheids are present in them in place of vessels.

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754. In angiosperms, how many microspore mother cells are required to produced 100 pollen grains:?
(a) 100 (b) 50
(c) 25 (d) 10

BVP-2001

Ans. (c) : Pollen grain formed from microspore mother cell by meiosis. In meiosis cell division 4 haploid (n) cells are formed from a single diploid (2n) cells.
All 4-microspore are active so all microspore taken part in formation Pollen grain.
Formation of 100 microspore 25 microspore mother cells (MMC) required.
• 4 pollen grains are formed from 1 MMC so 100 pollen grains are formed from 100/4 = 25 MMC

755. The shade tolerant plants are known as
(a) Psammophytes (b) Heliophytes
(c) Halophytes (d) Sciophytes
(e) Hydrophytes

Kerala PMT-2009

Ans. (d) : • Shade loving trees or plants are also known as sciophytes. They usually grow on the forest floor and under the canoppes of trees with thick falioge.
Sciophytes are also known as photohoborus plants. Example - Orchids.

756. Which one of the following series includes the orders Ranales, Parietales and Malvales ?
(a) Bicarpellatae (b) Thalamiflorae
(c) Calyciflorae (d) Disciflorae
(e) Inferae

Kerala PMT-2009

Ans. (b) : Thalamiflorae series includes the order Ranales, Parietales and malvales,. Thalamiflorae is an artificial group of classification by Augustin de candelle. It is a group under dicetyledeneus plants. All the three orders show thalamiflorae series. It includes plants which as conical thalamus and ovary is superior.

757. The plant of arid regions that modifies its stem into a flattened structure with chlorophyll pigments to carry out photosynthesis is
(a) Euphorbia (b) Opuntia
(c) Citrus (d) Bougainvillea
(e) Colocasia

Kerala PMT-2012

Ans. (b) : Euphorbia, colocasia and Bougainvillea grow in well drained soil but opuntia grows in arid regions which have little or no rain, like in xerophytic conditions. In these circumstance, the leaves are changed to resemble spines in order to minimize water loss through transpiration. On the other hand, the stem chang and undergo photosynthesis, becoming green and flattened. Phylloclade is a term for such stem alteration.

758. Which one of the following event takes place after double fertilization?
(a) The pollen grain germinates on the stigma
(b) The pollen tubes enter the embryosac
(c) Two male gametes are discharged into the embryosac
(d) The PEN (Primary Endosperm Nucleus) develops into endosperm
(e) The male gamete fuses with egg to form a zygote

Kerala PMT-2012

Ans. (d) : After double fertilization, the zygot develops into on embryo (with one or two cotyledons) and the PEN develops in to endosperm which provides nourishment to the developing emberyo. The synergids and antipodal degenerate after fertilisation during these events the ovules develop in to seed and the ovaries develop in to fruit.

759. A taxon is observed Himgiri variety which is resistant to hill bunt disease belongs to this taxon. In this taxon, pollen grains lose viability within 30 minutes of their release from anthers. The taxon belongs to the order
(a) Poales (b) Sapindales
(c) Polemoniales (d) Rosales

AP EAMCET-2014

Ans. (a) : Wheat variety Resistant to hill bunt disease is 'HImgiri'. Himgiri is a wheat hybrid that was developed by hybridization and selection for disease resistance and leaf and stripe rust pathogens. It is a disease resistance variety to stripe rust or yellow rust and also hill blunt. Wheat belongs to order 'Poales'.

760. Which of the following pairs in angiosperms are diploid and triploid respectively?
(a) Secondary nucleus and endosperm
(b) Microspore mother cell and egg cell
(c) Polar nucleus and secondary nucleus
(d) Endosperm and antipodal cells

JCECE-2010
AP EAMCET-2007

Ans. (a) : In an angiosperm the embryo sac is haploid, zygote is diploid and endosperm is triploid (3n) whereas, Nucellus, secondary nucleus and megaspore mother cell (MMC) are diploid (2n).

761. Triple fusion in angiosperms is the fusion of second sperm with
(a) antipodal cell and one synergid cell
(b) two antipodal cells
(c) two synergid cells
(d) two polar nuclei

JCECE-2010

Ans. (d) : Triple fusion in angiosperms is the fusion of second sperm with two polar nuclei. Fusion of second sperm cell with two polar nuclei results in the formation of a diploid zygote.

762. In angiosperms, lateral roots arise from –
(a) endodermis (b) cortex
(c) pericycle (d) epiblema

BVP-2000

Ans. (c) : The pericycle cells surround the xylem and phloem in the stem. Lateral roots is an extension of primary root which starts to develop in the pericycle, which is the outermost cell layer in the vascular cylinder. It facilitates a stronger connection between the plant and the soil and improves water absorption.

763. Acacia arabica is a :
(a) hydrophyte (b) mesophyte
(c) halophyte (d) xerophytes

BVP-2000

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Ans. (d) : Plants grow in dry habitat called xerophytic plant. In these plants, leaves are small and vestigial (while petiole enlarges) to cut transpiration. Lamina is vestigial, while petiole enlarges to form phyllode in Australian speices of Acacia. Phyllode refers to flattened petiole which is green and photosynthetic.
→ Acacia arabica is xerophyte because it is seen in desert places.

764. In angiosperm, triple fusion is necessary for the formation of:
(a) Embryo
(b) Pollen
(c) Endosperm
(d) Leaf

BHU PMT (Mains)-2006

Ans. (c) : In angiosperms, triple fusion is required for the formation of endosperm. It is the fusion of the male gamete with two polar nuclei inside the embryo sac of the angiosperm. In that process the fusion of three haploid nuclei occurs so it is known as triple fusion. Triple fusion is required for the formation of endosperm.

765. Which among the following is a rootless plant?
(a) Nymphaea (b) Sagittaria
(c) Ceratophyllum (d) Vallisneria

AIIMS-2007

Ans. (c) : Ceratophyllum is submerged floating hydrophytes.
- It remains completely under water but is not rooted in mud.

The flowering plant genus ceratophyllum is widespread and may be found in temperate and tropical areas in ponds, marshes and peaceful streams.

766. Which one shows the correct descending sequence with reference to the number of cohorts ?
(a) Thalamiflorae, Calyciflorae, Disciflorae, Inferae
(b) Heteromerae, Inferae, Disciflorae, Calyciflorae
(c) Bicarpellatae, Disciflorae, Heteromerae, Calyciflorae
(d) Disciflorae, Thalamiflorae, Calyciflorae, Heteromerae

AP EAMCET-2008

Ans. (a) : Thalamiflorae (6) - Calyciflorae (5) - Disciflorae (4) - Inferae (2)

767. Vessels and companion cells are found in
(a) angiosperm (b) pteridophytes
(c) bryophytes (d) thallophytes

JIPMER-2008

Ans. (a) : In Angiosperm (flowering plant), xylem contains vessels and phloem possesses sieve tubes and companion cells.
Vessels are abscent in pteridophytes except some species of selaginella, Adiantum, pteris, pteridium and equisetum. Also abscent in Gymnosperm except Gnetum welwistchia and Ephedra.
Companion cells abscent in pteridophytes and Gymnosperms.

768. A plant bears fruit, has a column of vascular tissue and a tap root system. The plant is a
(a) angiosperm and dicot
(b) gymnosperm and dicot
(c) angiosperm and monocot
(d) gymnosperm and monocot.

AIPMT-1994

Ans. (a) : A plant having column of vascular tissues bearing fruits and having a tap root system the plant is angiosperm and dicot. Dicotyledoneal is a group of angiosperms that are characterized by vascular tissue present in columns, seed are covered by fruits possess xylem vessels, tap root system.

G. Life process of plants and Alternation of Generation.

769. Match the plant with the kind of life cycle it exhibits:

	List-I		List-II
(A)	**Spirogyra**	**(i)**	**Dominant diploid sporophyte vascular plant, with highly reduced male or female gametophyte**
(B)	**Fern**	**(ii)**	**Dominant haploid free-living gametophyte**
(C)	**Funaria**	**(iii)**	**Dominant diploid sporophyte alternating with reduced gametophyte called prothallus**
(D)	**Cycas**	**(iv)**	**Dominant haploid leafy gametophyte alternating with partially dependent multicellular sporophyte**

Choose the correct answer from the options given below:
(a) (A)-(ii), (B)-(iv), (C)-(i), (D)-(iii)
(b) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)
(c) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(d) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)

NEET-2022

Ans. (c) :	
Spirogyra	Dominant haploid free living gametophyte
Fern	Dominant diploid sporophyte alternating with reduced gametophyte called prothallus.
Funaria	Dominant haploid leafy gametophyte alternating with partially dependent multicellular sporophyte
Cycas	Dominant diploid sporophyte vascular plant with highly reduced male of female gametophyte.

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770. In which organisms the following structures are developed respectively?
Conidia; Non motile spores; Buds; Zoospores
(A) Chlamydomonas (B) Yeast
(C) Rhizopus (D) Pencillium
(E) Wolffia
(a) A, C, D, B (b) D, C, B, A
(c) B, C ,D, E (d) D, A, B, C

TS EAMCET-09.08.2021 Shift-II

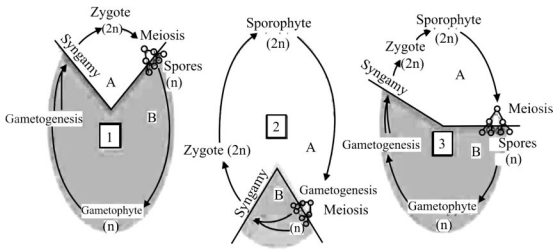
Ans. (b) : Conidia- Conidium, is a type of asexual reproductive spore of fungi (Kingdom fungi) usually produced at the tip or side of hyphae (Filaments that make up the body of a typical fungus) or on special spore-producing structure called conidiophores. The spores detach when mature.
Non motile spores- Rhizopus produce non motile spores called aplanospores, while others produce zoospores.
Buds- Budding is a type of asexual reproduction which is most commonly associated in both multicellular and unicellular organism. Bacteria, yeast, corals, flatworms, jellyfish and sea anemones are some animal species which reproduce through budding.
Zoospore- A zoospore is a motile asexual spore that uses a flagellum for locomotion. Also called a swarm spore, these spores are created by chlamydomonas.

771. Assertion (A) : In haplontic life cycle zygote acts as meiocyte.
Reason (R) : In spirogyra, non flagellated gametes will fuse to form zygote.
The correct option among the following is :
(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

Ans. (b) : In zygotic meiosis, the zygote acts as the meiocyte and meiosis occurs in diploid zygotes. Zygote and sporophyte will be diploid and gametophyte and gametes will be haploid. The gametophyte is the free-living, dominant phase in organisms with a **haplontic life cycle.**
Both gametes fuse to form diploid cells which form new individuals later. A spirogyra is a green algae also known as water silk or blanket weed. It is filamentous and possess helical chloroplast. These algae show Isogamy and Non-flagellated gametes and can reproduce both sexually and asexually.

772. Which of the following correctly represents the type of lifecycle patterns from the given options?



(a) 1–Haplontic, 2–Diplontic, 3–Haplo-diplontic
(b) 1–Diplontic, 2–Haplontic, 3–Haplo-diplontic
(c) 1–Haplo-diplontic, 2–Diplontic, 3–Haplontic
(d) 1–Diplontic, 2–Haplo-diplontic, 3–Haplontic

AP EAPCET-07.09.2021 Shift-I
Kerala PMT-2008

Ans. (b) : 1-Haplontic, 2-diplontic, 3- Haplo-diplontic
Diplontic life cycle:- sporophytic phase (2n) is dominant photosynthetic and independent. The gametophytic phase is represented by the single to few celled gametophyte. The gametes fuse to form zygote. Which develops into sporophyte. Example:- Fucus, gymnosperms & angiosperms.
Haplontic life cycle:- Gametophytic phase is dominant photosynthetic and independent, whereas sporophytic phase is represented by the zygote. Zygote undergoes meiosis to restore haploid condition.
e.g. volvox, spirogyra.
Haplodiplontic life cycle : - This type of life cycle is found in bryophytes and pteridophytes which is intermediate between haplontic and diplontic phase. Both the phases are multicellular.

773. Based on the following characteristics of life cycles identify and arrange the plants respectively.
(A) Haplontic (B) Diplo-haplontic
(C) Haplo-diplontic (D) Diplobiontic
(E) Diplontic
(i) Laminaria
(ii) Volvox
(ii) Polysiphonia
(iv) Salvinia
(v) Fucus
Options:

	A	B	C	D	E
(a)	i	iii	iv	v	ii
(b)	ii	iv	i	iii	v
(c)	ii	i	iv	iii	v
(d)	v	i	iii	ii	iv

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Haplontic — Volvox
Diplo–haplontic — Salvinia
Haplo–diplontic — Laminaria
Diplobiontic —Polysiphonia
Diplontic — Fucus

774. In Bryophytes & Pteridophytes the number of male gametes produced is several thousand times the number of female gametes produced.
Reason : Large number of male gametes fail to reach the female gametes during transport.
(a) Assertion is correct but reason in incorrect
(b) Both Assertion and reason are correct
(c) Both Assertion and reason are incorrect
(d) Assertion is incorrect but reason is correct

Karnataka CET-2021

Ans. (b) : Male gametes need to be transported to female gamete for fertilization. A large number of male gametes are destroyed or lose during transport. Hence, the male gametes are produced in large number.
Both Bryophtes and Pteridophytes use water for the transfer of male gametes to the female gametes.

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775. Which of the following statements is correct ?
(a) Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells
(b) Fusion of two cells is called Karyogamy
(c) Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy
(d) Organisms that depend on living plants are called saprophytes

NEET-2021

Ans. (c) : Fusion of protoplast of two cells is called plasmogamy. A significant stage - plasmogamy shown in sexual reproduction of fungi.
• In this stage, the cytoplasm of two motile or non-motile parent cells (usually from the mycelia) fuses together. In brings two haploid nuclei to close together in the same cell.

776. Male and female gametophytes do not have an independent free living existence in:
(a) Bryophytes
(b) Pteridophytes
(c) Algae
(d) Angiosperms

NEET-2020 Phase-II

Ans. (d) : Male and female gametophytes do not have free living existence in angiosperms.
• In gymnosperms and angiosperms, the gametophyte are dependent upon the sporophyte. In gymnosperms and angiosperms, the male & female gametophytes do not have a separate, free living life.

777. Choose the correct statements.
(A) Pseudoelaters, archegonia on archegoniophore are seen in Marchantia.
(B) Wolffia and Salvinia are the smallest plants belonging to pteridophytes.
(C) Embryophytic, archegoniate, tracheophytes with underground rhizome is seen in Dryopteris.
(D) Algae are primary producers of energy rich compounds for the aquatic animals.
(E) The reduced male gametophyte develops within the microspore.
(a) A, B, D only (b) A, B, C only
(c) C, D, E only (d) B, C, E only

TS EAMCET-29.09.2020 Shift-II

Ans. (c) : Algae are primary producers of energy which produces organic compounds such as Carbohydrates, proteins & lipids through photosynthesis. These compounds are utilized by other organisms such as herbivorous animals.
•The reduced male gametophyte develops within the microspore. Microspores are small haploid in structure which provides rise to the male gametophyte. The pollen grain represent the reduces male gametophyte as they contain the male gametes.
• Dryopteris is commonly known as wood fern, male ferns or sometimes also called as buckler fern. In belongs to the family of dryopteridaceae.
Therefore, embryophytic, archegoniate and tracheophytes with underground rhizome is seen in dryopteris.

778. A,B and C are heterotrophic plants, 'A' has no sex organs but produces sexual spores exogenously, 'B' produces sexual spores endogenously and 'C' has no sexual stage but reproduces asexually. Based on these characters, identify A, B and C respectively.
(a) Rhizopus, Aspergillus, Alternaria
(b) Colletotrichum, Albugo, Penicillium
(c) Ustilago, Neurospora, Trichoderma
(d) Aspergillus, Agaricus, Alternaria

AP EAMCET-24.04.2019 Shift-II

Ans. (c) : Ustilago, Neurospora, Trichoderma
Ustilago- is autoecious i.e. it completes its life cycle on a single host. Sex organ are completely absent. It produced two kinds of spore during its life cycle Teliospores or teleutospores and basidiospores.
• **Neurospora** the spores are endogenously formed in a sac like structure called ascus. sac spore forming structure in ascomycetes and basidium is a spore forming structure in basidiomycetes.
• Most **Trichoderma** strains have no sexual stage but instead produce only sexual spore. However for a few strains the sexual stage is known but not among strains that have usually been considered for bicontrol process is within the accomycetes in the genus Hypocrea.

779. Choose the correct pair of taxa showing following sets of characters in sequence
(I) Trachaeophytic heterosporous plants with siphonogamous oogamy
(II) Trachaeophytic heterosporous plants with archegonia
(III) Archegoniates with zooidogamous oogamy
(A) Marchantia and selaginella
(B) Salvinia and pinus
(C) Polytrichum and Eucalyptus
(D) Cycas and Eucalyptus
Options:
(a) D, B, A (b) C, D, B
(c) B, D, A (d) D, A, C

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : Trachaeophytes also called vascular plant possess lignified water- conducting tissue. Trachaeophytes have transport vessels, xylem and phloem. Ex. Eucalyptus, Cycas.
•**Heterosporous plants:-** Megaspores and microspores are produced in the megasporangia and microsporangia respectively. The sporangia are borne on spirally arranged megasporophyll and microsporophyl. ex. Pinus cycus, Selaginella, salvia.
• Zooidogamy is a type of plant reproduction in which male gametes (antherozoids) swim in a path of water to the female gamete (archegonium). Zooidogamy is found in algae, bryophytes, pteridophytes, and some gymnosperms. Ex. Marchantia, cycas, selaginella.

780. Assertion (A): Gametophyte is represented by few celled or many celled stage called diplo-haplontic life cycle.
Reason (R): Pteridophytes and all seed bearing plants follow diplo-haplontic life cycle pattern.
The correct answer is:

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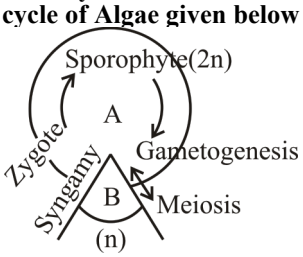
(a) Both (A) and (R) are true. (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : The gametophyte represents the sexual phase of the life cycle, as gametes are produced in this phase. Plant sporophyte represent the asexual phase of the cycle and produce spores.
In the diplontic life cycle, the diploid sporophyte is the dominant photosynthetic independent phase of the plant body. The haploid phase is represented by gametes only.

781. Identify correct answer with reference to life cycle of Algae given below



(a) It is haplo–diplontic life cycle of Laminaria
(b) Sporophyte is dependent on Gametophyte
(c) Sporophyte and Gametophyte are independent
(d) It represents life cycle of Fucus

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : The given figure in the question represents the life cycle of Fucus. Fucus has a diplontic life cycle. Generally, most of the algae are haplontic where as few other are diplontic. Fucus is one such algal that exhibits diplontic behavior i.e. sporophyte is the dominant phase in case of fucus.

782. Match of the following lists

List -I	List - II
(A) Ascocarp	**(I) A spore produced by an ascus**
(B) Haplontic	**(II) An asexual spore produced by certain algae and some fungi, capable of moving about by means of flagella**
(C) Zoospore	**(III) A life cycle in which the haploid phase predominates and the diploid stage is limited to the zygote**
(D) Ascospore	**(IV) A non-motile, thin-walled spore**
	(V) It is the fruiting body of ascomycetous fungi

The correct match is:

	A	B	C	D
(a)	III	IV	V	II
(b)	IV	II	III	I
(c)	II	I	IV	III
(d)	V	III	II	I

TS EAMCET-12.05.2017

Ans. (d) : Ascocarp is fruiting body (sporocarp) of an ascomycetes, phylum fungus. It consist of very tightly interwoven hyphae and millions of embedded asci each of which typically contains four to eight ascospores.
• Haplontic life cycle is the free - living independent, haploid stage that divide to give rise to a new organism for example green algae.
• Zoospores are motile asexual spores that are found in bacteria fungi and protists. These spores are flagellated and posses different ultrastructural properties in different organisms. Some of the common properties are
(i) they are naked.
(ii) they do not possess any wall.
• Ascospores are generally found in clusters of four or eight spores with a single mother cell, as in the ascus. These spores are formed as a means of packaging post meiotic nuclei.

783. In plant 'A', sporophyte is not free living, 'B' zygote represents short lived sporophyte, 'C' independent gametophyte and sporophytic generations. The organisms A, B and C are respectively

(a) Volvox, Lycopodium, Marchantia
(b) Lycopodium, Volvox, Marchantia
(c) Marchantia, Volvox, Lycopodium
(d) Marchantia, Lycopodium, Volvox

AP EAMCET-28.04.2017 Shift-II

Ans. (c) : • Marchantia ;- Marchanitia is bryophytes in which the sporophyte is dependent an gametophyte that is why sporophyte is not free living.
• The life cycle of volvox is haplontic i.e. the dominant stage in free living haploid (n) gamatophyte and sporophyte is represents only by the diploid zygote (n) In valvox sporophytic generation is represented only by the one called zygote. There are no-free living sporophytes.
• Lycopodium :- Lycopodium is a sparophyte (2n) with distinct sporophytic (2n) and gametophytic (n) generations which alternate with each other.

784. Choose the correct statement from the following.

(A) In pheophyceae members the cell wall is covered by gelatinous coating called algin.
(B) Mosses, along with lichens are the first organisms in the Xerarch succession.
(C) All bryophytes are not homosporous but show heteromorphic alternation of generations.
(D) Some chlorophyll bearing thalloid organisms grow in association with sloth bear.

Options:

(a) A, B, C (b) B, C, D
(c) A, B, D (d) A, C, D

AP EAMCET-28.04.2017 Shift-II

Ans. (c) : A Xerarch succession is a form of plant succession starting in the bare ground that is very dry or is limited by the availability of water and eventually culminating in a mature forest.
Such communities usually originate from extremely dry environments - such as rock deserts and sand dynes. Lichens produce rocks in Xerarch succussion and exude acide chemicals mosses like lichens have evolved to

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with sand severe drought. Algae are chlorophyll-bearing, simple, thaloid, autotrophic and largely aquatic organisms. They occur in a variety of other habitats. Moist stones, soil and wood. Some of them also occur in association with fungi and animal exa - on sloth bear.

785. In Cycas
(a) ovule and microsporangia are present in same sporophyll
(b) micro and megasporophyllus are present in same cone
(c) male cone and megasporophylls are borne on the same plant
(d) male cone and megasporophylls are borne on separate individual plants

AIIMS-2017

Ans. (d) : Cycas plants are dioecious. These plants have male and female reproductive structures on different plants.
The male sporophyte will have minute **microsporangia** in the abaxial surface of the **microsporophyll.** The female cone will have loosely arranged **megasporophylls**. There **megasporophylls** will have ovules.

Male Cone Female Cone

786. Read the following statements regarding bryophytes and choose the incorrect option.
(a) Gametophytic phase is dominant in life cycle
(b) Fertilisation takes place in presence of water
(c) Zygote undergoes meiosis to produce sporophyte
(d) Sporophyte is physiologically dependent on gametophyte

AIIMS-2017

Ans. (c) : A diploid zygote is formed after the process of fertilisation which undergoes many rounds of mitosis and give rise to a diploid multicellular sporophyte. The specialized cells of the sporophyte further undergoes meiosis form haploid spores. These spores develop into gametophytes.
• The haploid stage, in which a multicellular haploid gametophyte develops from a spore and produces haploid gametes, is the dominant stage in the bryophyte life cycle.

787. Life cycle of Ectocarpus and Fucus respectively are
(a) Haplontic, Diplontic
(b) Diplontic, Haplodiplontic
(c) Haplodiplontic, Diplontic
(d) Haplodiplontic, Haplontic

NEET-2017

Ans. (c) : Life cycle of Ectocarpus is Haplodiplontic. Ectocarpus has a haploid-diploid life cycle that involves alternation between two multicellular generation, the sporophyte and the gametophyte.
In this, the free-living, multicellular haplontic and diplontic are both present. the major component of the diplontic life cycle is the diploid sporophyte.
Both the haplodiplontic and diplontic life cycle are seen in the algae ectocarpus and fucus.

788. Which of the following statement is true?
(a) Spores are gametes
(b) Spores and gametes are diploid
(c) Gametes are always haploid
(d) Spores are always diploid

AIIMS-2000

Ans. (c) : Gametes - gametes are formed through meiosis (reductional division) in which a germ cell undergoes two fissions, resulting in the production of 4 gametes. During fertilization, male and female gamete fuse, producing a diploid (i.e. containing paired chromosomes) zygote.

789. Read the following statements (A – E) and answer the question which follows them.
(A) In liverworts, mosses and ferns gametophytes are free living
(B) Gymnosperms and some ferns are heterosporous
(C) Sexual reproduction in Fucus, Volvox and Albugo is oogamous
(D) The sporophyte in liverworts in more elaborate than that in mosses
(E) Both, Pinus and Marchantia are dioecious
How many of the above statements are correct ?
(a) Four (b) One
(c) Two (d) Three

NEET-2013

Ans. (d) : In the given statement, D is wrong because the sporophyte found in mosses is more elaborate than the sporophyte found in liverworts.
In dioecious condition, the plant body bear a single spore either male or female, though the Marchantia is dioecious, Pinus is not. Pinus show the monoecious condition i.e. both male and female parts present on the same plant. Hence both pinus and marchantia are dioecious. This statement is wrong. In liverworts mosses and ferns gametophytes are free living. This statement is true. Oogamous type of sexual reproduction is found in Fucus, Volvox and Albugo. Gymnosperm and some ferns are heterosporous. This statement is also true.

790. Select the wrong statement :
(a) Chlamydomonas exhibits both isogamy and anisogamy and Fucus shows oogamy
(b) Isogametes are similar in structure, function and behaviour
(c) Anisogametes differ either in structure, function or behaviour
(d) In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile

NEET-2013

Ans. (d) : Oomycetes are fungus-like eukaryotic microbes. They reproduce both sexually and asexually. They include many pathogenic species of plants. Two distinct spore types are produced by oomycetes. The female gametes in sexual spores are big and non-motile. The male spore or gamete, in contrast, is tiny and motile.

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791. Isogamous condition with non-flagellated gametes is found in :
(a) Fucus (b) Chlamydomonas
(c) Spirogyra (d) Volvox

NEET-2013

Ans. (c) : Isogamous (similar in size) condition with non-flagellated gametes is found in Spirogyra in which both gametes are non-motile.
In Fucus and Volvox, motile male gametes and non motile female gametes are produced.
In Chlamydomonas, flagellated gametes are seen which are dissimilar or similar in size.

792. Gametophyte is the dominant phase in the lifecycle of .....
(a) Hibiscus (b) Nephrolepis
(c) Cycas (d) Riccia

Karnataka CET-2011

Ans. (d) : Sporophyte is the diploid stage and the gametophyte is the haploid stage. Gametophyte is the dominant phase in the lifecycle of bryophytes, which are the non-vascular plants. Riccia is a liverwort, belongs to bryophyte and hence it exhibit the dominant gametophytic stage.

793. Gametophyte and sporophyte are independent of each other in which of the following groups?
(a) Pteridophytes (b) Angiosperms
(c) Gymnosperms (d) Bryophytes

AIIMS-2010

Ans. (a) : Gametophyte and sporophyte are independent of each other in pteridophyte, because gametophyte is small or inconspicuous and sporophyte is differentiated into true root, stem and leaves.
Bryophytes are non-vasculor terrestrial plant of moist habitats in which multicellular diploid sporphyte live as parasite. Gymnosperms and angiosperms do not produce spores.

794. Elater mechanism for seed dispersal is exhibited by
(a) Riccia (b) Marchantia
(c) Dryopteris (d) Funaria

AIIMS-2014

Ans. (b) Elaters are the long spindle shaped hygroscopic structures with spiral thickening inside them. They are mostly found in liverworts like Marchantia. The resulting twisting movement helps in dispersal of spores.

795. Match items in Column I with those in Column II.

Column-I	Column-II
A. Peritrichous Flagellation	**1. Ginkgo**
B. Living fossil	**2. Selaginella**
C. Smallest flowering Plant	**3. E. coli**
D. Largest perennial alga	**4. Wolffia**
E. Rhizophore	**5. Macrocystis**

(a) A-3, B-1, C-4, D-5, E-2
(b) A-2, B-3, C-4, D-1, E-5
(c) A-4, B-2, C-1, D-5, E-3
(d) A-2, B-4, C-3, D-5, E-1

AIIMS-2014

Ans. (a)

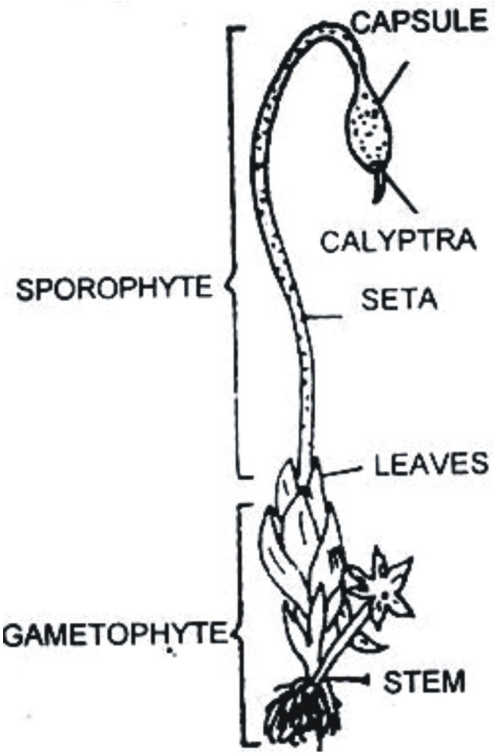
A. Peritrichous Flagellation	–	E. coli
B. Living fossil	–	Ginkgo
C. Smallest flowering Plant	–	Wolffia
D. Largest perennial alga	–	Macrocystis
E. Rhizophore	–	Selaginella

796. The plant body of moss *(Funaria)* is
(a) Completely sporophyte
(b) Predominantly sporophyte with gametophyte
(c) Completely gametophyte
(d) Predominantly gametophyte with sporophyte.

AIIMS-2002

Ans. (d) : In the life cycle of bryophytes, the gametophytic generation is the major stage. Gametophyte activity determines the sporophyte phase. That is why, the plant body of funaria moss is predominantly gametophytic with dependent sporophyte.

- Zygote develops into sporophyte and produces haploid meiospores which on germination form gametophyte. Sporophyte in mosses is differentiated into foot, seta and capsule.



797. Mosses and ferns are found in moist and shady places because both
(a) Require presence of water for fertilization
(b) Do not need sunlight for photosynthesis
(c) Depend for their nutrition on microorganisms which can survive only at low temperature
(d) Cannot compete with sun-loving plants.

AIIMS-2004

@apna_pdf

Ans. (a) : Mosses and ferns can only reproduce in the presence of water, via motile antherozoids that swim to reach the archegonium, hence they can only be found in damp environments.
Mosses lack vascular tissue, also both mosses and ferns require water to carry out sexual reproduction.

798. In *Ulothrix* meiosis takes place in
(a) Cells of the filament
(b) Holdfast
(c) Zygote
(d) Zoospores.

AIIMS-2004

Ans. (c) : The ulothrix plant are heterothallic and is sexualIy reproduced also by biflagellate gametes. Ulothrix meiosis (reduction division) occurs in zygote. Zygote (2n) undergoes meiosis to form four haploid quadriflagellate zoospores, each zoospore then develops into a new ulothrix thallus. Mitosis is followed by meosis to form 8 or 16 haploid nuclei.

799. Physiological heterospory is seen in :
(a) chlamydomonas (b) rhizopus
(c) selaginella (d) lycopodium

DUMET-2004

Ans. (c) : Selaginella Heterospory is important with respect to the evolutionary perspective. Heterospory is found in some pteridophytes and all seed plants i.e. gymnosperms and angiosperms. In selaginella, all the microsporocytes or microspore mother cells undergo meiosis to produce a large number of microspore whereas only one megasporocyte is functional and produces four large megaspores after meiosis.
• Heterospory become evident before meiosis as in selaginella.
• Microspore are present in microsporangia, whereas megaspore are present in magasporangia.

800. In prothallus of a vascular cryptogamic, the antherozoids and eggs mature at different times. As a result of
(a) self-fertillisation is prevented
(b) it can be concluded that plant is apomictic
(c) there is a low degree of fertility
(d) no change in success rate of fertilization

Manipal-2014

Ans. (a) : Vascular cryptogams usually multiply through sexual reproduction. They adopt various methods in order to prevent self-fertilization. When an antherozoid and an egg from the same plant develop at different time they are unable to fertilize one another, avoiding self-fertilization. If the antherozoid matures before egg it is termed as protandry. If the egg matures before antherozoid it is termed protogyny
• The difference in maturation period of antherozoid and egg has no relation with fertility rate in the plant. Its nothing more than a plant's way of preventing self-fertilization.
• The success rate of self-fertilization decreases while that of cross fertilization increases

801. Prothallus of the fern produces
(a) spores (b) gametes
(c) Both (a) and (b) (d) cones

VMMC-2009

Ans. (b) : Prothallus of the fern produces gametes. Prothallus in the fern produces male and female gametes which after fertilization give rise to diploid which sporophyte which produces spore. The underside of the prothallus is where the gametes are produced from the male and female sex organs. Prothallus of the fern is gametophyte. It is green photosynthetic structure that is one cell thick usually heart or kidney shaped, 3-10 mm long and 2-8 mm broad.

802. Calyptra develops from
(a) venter wall of archegonium
(b) outgrowth of gametophyte
(c) neck wall of archegonium
(d) paraphysis of the archegonial branch

VMMC-2009

Ans. (a) : Calyptra develops from venter wall of archaegonium. The protective covering around the eggs/sporophyte present inside the archegonium is known as calyptra. Cells in the enlarged portion of the archegonium, a structure resembling a flask, will produce calyptra as long as the egg is present there. Calyptra is often refered to as a hood, acover or a lid. It is a maternal gametophytic structure which is small and covers the capsule which contain the eggs/embryonic sporophyte. As the sporophytes are released from the capsule that is present in the center of the archegonium calypter disappears. It is considered to be a haploid tissue that grows in close association with the sporophytes in case of bryophtes and gymnosperms.

803. Match the organism in column A with the Contents in Column B.

Column A	Column A
(A) Gracilaria	(I) Biflagellate zoospores
(B) Ectocarpus	(II) Elaters
(C) Marchantia	(III) Biflagellate antherozoids
(D) Cycas	(IV) Carpogonium
	(V) Multiciliated male gametes

	A	B	C	D
(a)	(I)	(IV)	(III)	(V)
(b)	(IV)	(I)	(II)	(V)
(c)	(IV)	(II)	(III)	(I)
(d)	(IV)	(V)	(II)	(I)

AP EAMCET-2015

Ans. (b) : The carpogonium in Gracilaria has been observed by Bornet and thuret he reported that fertilized female nuclease remind in carpogonium which fused with the bottom cell of a vegetative filament arising from the supporting cell.
• Asexual reproduction in Ectocarpus take place by biflagellated zoospores that are produced in both unilocular and plurilocular sporangia.
• In marchantia some of the sporophytes (spore mother cells) that are diploid will remain diploid and undergo a change to form elaters.
• Male gametes of cycas are multicilliated top shaped equal and the largest in plant kindgom.

804. Development of gametophyte from sporophyte without formation of spores is called:
(a) apogamy (b) apospory
(c) autogamy (d) hologamy

J&K CET-2003

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Ans. (b) : Apospory:- Apospory is the development of diploid (2n) gametophytes without meiosis and spores, formation from vegetative or non reproductive cells of the sporophyte.

805. The gametophyte generation is dominant in:
(a) Gymnosperm (b) Bryophyte
(c) Angiosperm (d) Pteridophyta

Rajasthan PMT-1995

Ans. (b) : Gametophyte generation is dominant in Bryophyte & life cycle is haplo -diplontic.
Sporophytic generation is dominant in pteridophyta & life cycle is haplo-diplontic.
Gymnosperm - sporophytic phase is dominant- life cycle is Diplontic

806. In gametophyte of fern :
(a) prothallus is independent from sporophyte
(b) prothallus is attached with sporophyte
(c) it is main plant body
(d) a structure attached with rhizome

Rajasthan PMT-2001

Ans. (a) : The prothallus represents the haploid gametophytic generation. It is multicellular, independent, photosynthetic form that lives for a short duration. The prothallus needs a cool, damp and shady place to grow.

807. Which of the following is/are grouped under phanerogams?
(a) Angiosperms (b) Gymnosperms
(c) Pteridophytes (d) Both (a) and (b)

Manipal-2008

Ans. (d) : Phanerogams- German botanist A.W. Eichler divided the whole plant kingdom into phanerogams and cryptogams. Phanerogams are the most advanced plants on our planet and their plant body is divided into roots stems and leaves. They have particular reproductive organs that produce seeds also known as seed-producing plants. The pine trees, grasses, crops flowers, bamboo trees etc which we see around us all belongs to phanerogams it is the largest subkingdom. Which is divided into two parts gymnosperm and angiosperm.

808. An immature male gametophyte differs from a mature male gametophyte in that it
(a) has not yet left the pollen sac
(b) has not yet germinated and its generative cell has not divided into two male gamete
(c) is a microspore that has not yet divided by mitosis
(d) still consist of microsporocyte

AMU-2014

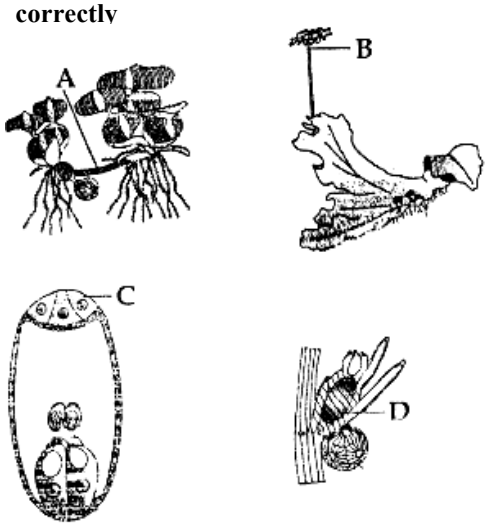
Ans. (b) : The pollen is immature or partially developed male gametophyte similarly, the unicellular microspore produce male gametes and develops into mature microgametophyte by the process of mitotic cell division. Hence the pollen grains are immature male gametophyte and partially developed male gametophyte. An immature male gametophyte differs from a mature male gametophyte in that it has not got germinated. At the maturity the male gametophyte consists of three cells, vegetative cell and two sperm cell.

809. Which of the following statement is correct?
(a) In Cycas, megasporophyll produce pollen grains
(b) In Agaricus gills produce basidiospores
(c) In Aspergillus, fruiting body is perithecium
(d) In Funaria capsule represents gametophytic generation

Rajasthan PMT-2002

Ans. (b) : Agaricus completes its sexual cycle by producing basidiospores on the margins of the gills of the mushroom. Like almost all fungi in the Basidiomycete group, the organism exists primarly in a dikaryon state where each cell has two nuclei one from each parent produced after two haploid hyphae fuse.
Short lived primary mycelium originates from homokaryotic basidiospores.

810. Examine the figures (A-D) given below and select the right option out of 1-4, in which all the four structures A, B, C and D are identified correctly



Options :

	A	B	C	D
(a)	Sucker	Seta	Megaspore mother cell	Gemma cup
(b)	Rhizome	Sporangiophore	Polar cell	Globule
(c)	Runner	Archegoniophore	Synergid	Antheridium
(d)	Offset	Antheridiophore	Antipodals	Oogonium

AIPMT (Mains)-2010

Ans. (d) : A- Offset of water hyacinth (Eichhornia).
B- Antheridiophore of marchantia
C- Antipodals of the mature embryo sac.
D- Oogonium of Chara

811. Which one of the following is considered important in the development of seed habit ?
(a) Free-living gametophyte
(b) Dependent sporophyte
(c) Heterospory
(d) Haplontic life cycle

AIPMT-2009

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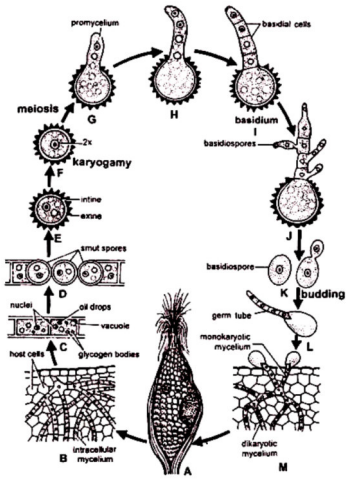
Ans. (c) : Heterospory is thus considered an important step in evolunton as it is a precursor to the seed habit. Heterospory evolved first in pteridophytes such as Selaginella and Salvinia. The seed habit is the most complex and evolutionary method of sexual reproduction.

812. Which one of the following has haplontic life cycle ?

(a) Wheat (b) Funaria
(c) Polytrichum (d) Ustilago

AIPMT-2009

Ans. (d) : Ustilago shows haplontic life cycle. Where the haploid stage is multicellular and the diploid stage is unicellular. When a plant has been haploid for the life cycle, it is referred to as the haplontic life cycle. Lifecycles can be haploid, diploid or alternating between the two and may either be haplontic, diplontic or haplo-diplontic.



Diagrammatic life cycle of Ustilago

813. Heterospory is the production of

(a) sexual and asexual spores
(b) large and small spores
(c) haploid and diploid spores
(d) diploid and tetraploid spores

JIPMER-2004

Ans. (b) : Heterospory is the production of spores of two different size and sexes by the sporophytes of land plant. In some pteridophytes two type of spores are formed which differ significantly in their size and also in function. This phenomenon is called heterospory example- Selaginella and Marsilea etc.

814. Study the following lists.

List I	List II
(A) Neck of archegonium In *Funaria*	**(i) Two-nucleated**
(B) Neck of archegonium in *Pteris*	**(ii) Two - celled**
(C) Neck canal cells in *Pteris*	**(iii) Zero**
(D) Neck canal cell in Cycas	**(iv) Six vertical rows of cells**
	(v) Four vertical rows of cells

The correct match is :

	A	B	C	D
(a)	3	4	2	5
(b)	4	5	1	3
(c)	3	4	2	1
(d)	4	3	5	1

AP EAMCET-2010

Ans. (b) : Neck of Archegonium in Funaria :- Mature archegonium has a long columnar stalk, a swollen venter and an elongated neck. The wall of venter is two layered, but that of neck is single layered, consisting of cell arranged in six spirally twisted rows of cell. Neck consist of 6 or more neck canal cell (6-11).

Neck of Archegonium pteris :- Archegonium is the female reproductive organ in fern and mosses. Neck-canal cell is located above the egg. It has four ventrical row of cell.

Neck canal cell in Pteris :- Neck canal cell in Pteris is single & binucleated because the neck of Dryopteris is made up of four vertical rows of cells.

Neck canal cell in Cycas :- Neck canal cell are absent in cycas.

List-I	List-II
(a) Neck of archegonium in Funaria	Six vertical rows of cell
(b)Neck of archegonium Pteris	Four ventrical row of cell
(c) Neck canal cell in Pteris	Two Nucleated
(d) Neck canal cell in Cycas	Zero

815. Study the following lists:

List-I	List-II
A. Pteris—Spermatozoids	**1. Zooidogamy**
B. Cycas—Male gametes	**2. Malic acid**
C. Funaria—Antherozoids	**3. Oogamy**
D. Spirogyra—Aplanogametes	**4. Sucrose**
	5. Physiological anisogamy

The correct match is:

	A	B	C	D
(a)	1	5	4	3
(b)	3	2	4	5
(c)	2	5	4	1
(d)	2	4	3	5

AP EAMCET-2005

Ans. (d) :

List-I	List-II
A. Pteris- Spermatozoids	Malic acid
B. Cycas- Male gametes	Sucrose
C. Funaria- Antherozoids	Oogamy
D. Spirogyra- Aplanogametes	Physiological anisogamy

During fertilization, the spermatozoids are attracted by the malic acid released by the archegonia of the pteris. In order to attract the male gametes during fertilization, the cycas archegonia exude dissolved sucrose.

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• Oogamy occurs in Funaria and in Spirogyra the aplanogametes are of + Strain i.e. male and- Strain i.e. female and thus they show physiological an-isogamy.

• Physiological anisogamy is risible at the time of conjugation when one of two isogametes show motility and is considered as the male gamete. This phenomenon is referred to as physiological anisogamy, as they show dissimilar physiological function.

816. Flagellated male gametes are present in all the three of which one of the following sets ?

(a) Riccia, Dryopteris and Cycas
(b) Anthoceros, Funaria and Spirogyra
(c) Zygnema, Saprolegnia and Hydrilla
(d) Fucus, Marsilea and Calotropis

AIPMT-2007

Ans. (a) : There are two types of gametes male and female gametes that when fused produce offspring. A genus of liver worts called Riccia is a bryophytes male gametes on it are biflagellated.
Dryopteris is a pteridophyte and have a multiflagellate male gametophyte. The gymnosperm group of plants includes cycas which have muciliated male gametes. The male gametes in cycas are top shaped, equal and spirally coiled.

817. In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result:

(a) Self fertilization is prevented
(b) There is no change in success rate of fertilization
(c) There is high degree of sterility
(d) One can conclude that the plant is apomictic

AIPMT-2007

Ans. (a) : In prothallus of vascular cryptogams, the antherozoids and egg mature at different times and is called as an outbreeding divce. The antherozoids are biflagellated or multiflagellated. As a result, of which self-fertilization is prevented and cross fertilization occurs.

818. Gametophyte is dominant stage in the life cycle of

(a) bryophyta (b) pteridophyta
(c) angiosperms (d) gymnosperms

UP CPMT-2011

Ans. (a): The life cycle of a bryophyte includes the gametophytic and sporophytic phases, both of which are morphologically distinct. The gametophytic phase differe from one another morphologically. The gametophytic phase is more conspicuous independent and dominant while saprophyte depend on gametophyte.

819. Match the plant structures given in the column-I with their plants given in the column–II.

Column-I	Column-II
A. Prothallus	**p. Bryophytes**
B. Microsporophyll	**q. Pteridophytes**
C. Protonema	**r. Angiosperms**
D. PEN	**s. Gymnosperms**

(a) A-r, B-p, C-s, D-q (b) A-s, B-r, C-p, D-q
(c) A-q, B-s, C-r, D-p (d) A-q, B-s, C-p, D-r

Karnataka CET-2016

Ans. (d) :

Column–I	Column–II
(A) Prothallus	Pteridophytes
(B) Microsporophyll	Gymnosperms
(C) Protonema	Bryophytes
(D) PEN	Angiosperms.

820. Which of the following taxa shows zooidogamous oogamy?

(i) Spirogyra (ii) Funaria
(iii) Pteris (iv) Cycas
The correct sequence is :

(a) (i), (ii), (iii) (b) (i), (iii), (iv)
(c) (i), (ii) , (iv) (d) (ii), (iii), (iv)

AP EAMCET-2009

Ans. (d) : Zooidogamy is a type of fertilization which is seen in certain plants, in which male gametes swim in the water to reach the female gametes, thus male gametes are motile and flagellated, which helps them to swim in water. For example, bryophytes, pteridophytes and some gymnosperms exhibit zooidogamy during sexual reproduction.

• **In Funaria,** a liberated antherozoid swim towards the female archegonium in the presence of water.

• Pteris reproduces vegetatively by the older rhizome segments eventually dying and decomposing. They therefore fall under the category of pteridophytes.

• **In Cycas,** they are oogamous where the male gamete is significantly larger than the male. The male gamete being motile reaches up the female gamete in order to take in for fertilization.

821. A plant completing its life cycle before the onset of dry condition is said to be :

(a) short day plant (b) long day plant
(c) drought escaping (d) all of the above

AFMC-2000

Ans. (c) : A plant completing its life cycle before the onset of dry condition is said to be drought escaping.
It is the ability of a plant to complete the life cycle before serious soil and plant water deficits develop.
Drought escaping plant species are annuals which germinate and grow only when there is sufficient moisture available to complete their life cycle.

@apna_pdf

822. The branch of biology, which deals with the study of processes and functions of an organism, is called:
(a) histology (b) anatomy
(c) physiology (d) entomology
BHU PMT-2004

Ans. (c) : The branch of biology, which deals with the study of processes and functions of an organism is called physiology. It also helps us to determine what goes wrong in disease, facilitating the development of new treatments and guidelines for maintaing human and animal health. This branch of biology tells us how organisms organ systems, organs, cells and bio-molecules function in living organisms.

823. A typical foliage leaf comprises
(a) hypopodium (b) mesopodium
(c) epipodium (d) all of these
AMU-1996

Ans. (d) : Foliage leaves are the leaves found on the main stem and branches. These are green in colour and perform the function of photosynthesis. A foliage leaf consist of three parts.
1. Leaf base is called Hypopodium.
2. Petiole is also called as Mesopodium.
3. Lamina is called as Epipodium.

824. Sporangia bearing leaf is called
(a) cataphyll (b) sporophyll
(c) leaflet (d) cladophyll
AMU-2002

Ans. (b) : Sporangia bearing leaf is called sporophyll. Several sporangia grouped together are called as sorus. Sporangia can produce spores by mitosis but in nearly all land plants and many fungi, sporangia are the site of meiosis and produce genetically distinct haploid spores.

825. Match the following column I with column II.

	Column-I		Column-II
A.	**Phototaxis**	**1.**	**Circular movement of protoplasm with response to warm condition**
B.	**Chemotaxis**	**2.**	**Downward movement of floral organs (closing flower)**
C.	**Seismonasty**	**3.**	**Movement of chla-mydomonas**
D.	**Hyponasty**	**4.**	**Movement of antherozoids towards archegonia**

(a) A - 3 B - 4 C - 1 D - 2
(b) A - 1 B - 2 C - 3 D - 4
(c) A - 4 B - 2 C - 3 D - 1
(d) A - 3 B - 1 C - 4 D - 2
CMC Ludhiana-2015

Ans. (a) :

	Column-I	Column-II
A.	Phototaxis	Movement of chlamydomonas
B.	Chemotaxis	Movement of autherozoids towards archegonia
C.	Seismonasty	Circular movement of protoplasm with response to warm condition Drooping of leaf
D.	Hyponasty	Downward movement of floral organs (Closing flower)

A. Phototaxis- Phototaxis is a type of locomotary movement that occurs when a whole organism moves towards or away from a stimulus of light.
B. Chemotaxis- Response to the chemical stimulus.
C. Seismonasty- It is due to change in turgidity.
D. Hyponasty- More growth occurs on lower surface. Flowers closed and folding of leaves occurs.

826. Which of the following pairs are correctly matched? (1) Fertile spike? Ophioglossum (2) Sporangiophore? Equisetum (3) Synangium? Psilotum (4) Apophysis? Spirogyra
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 1, 2 and 4 are correct
(d) 1 and 3 are correct
BHU PMT (Mains)-2006

Ans. (a) :
Fertile spike - ophioglossum
Sporangiophore - equisetum
Synangium - psilotum

827. Cotton belonges to family :
(a) Solanaceae (b) Cucurbitaceae
(c) Leguminoseae (d) Malvaceae
MGIMS Wardha-2003

Ans. (d) : The cotton belongs to family Malvaceae. The surface fibres are obtained from cotton seed hairs which are used in textile industries for making clothes. Cotton fibre is mainly made up of cellulose.

828. Masses of pollen grains, i.e., pollinia is found in
(a) Gramineae (b) Solanaceae
(c) Orchidaceae (d) Malvaceae
JIPMER-2013

Ans. (c) : Pollinia is a coherent mass of pollen grains. The orchidoideae have a single terminal stamen and the anthers produce one or more waxy masses of pollen called as pollinia. The stigma is proximal to the single terminal stamen. It is found in calotropis and orchids.

@apna_pdf

829. Lady finger belongs to family

(a) Malvaceae (b) Cucurbitaceae
(c) Brassicaceae (d) Liliaceae

JIPMER-2013

Ans. (a) : Lady finger or Okra belongs to the family Malvaceae, which contains plants with gamosepalous calyx, polysepalous petals, monothecos anthers, syncarpous gynoecium. The scientific name of lady's finer is Abelmoschus esculentus.

830. Match the following with correct combination.

Column I	Column II
A. Cuscuta	1. Saprophyte
B. Eichhornia	2. Pneumatophare
C. Monotropa	3.Insectivorous plant
D. Rhizophora	4. Parasite
E. Utricularia	5. Root pocket

Codes

	A	B	C	D	E
(a)	3	1	5	4	2
(b)	2	3	1	5	4
(c)	4	3	1	5	2
(d)	4	5	1	2	3

JIPMER-2013

Ans. (d) : Cuscuta is genus which includes nearly 100-170 species of yellow, orange, or red parasitic plant.

- Eichhornia is a aquatic flowering plants with develop root pockets.
- Monotropa is a Saprophytic plant. *Monotrapa uniflora* also known as Indian pipe.
- Rhizophora is a mangrove trees with pneumatophores.
- Utricularia is a genus of insectivorous plants.

831. The largest ovules in the plant world are found in:

(a) Tsuja (b) Pinus
(c) Banyan (d) Cycas

AFMC-2002

Ans. (d) : The Cycas belongs to gymnospermic group of plants. It contains largest ovules, which are orthotropous (upright) type ovule. It contains a thick integument which can be divided into three layers, namely, outer fleshy, middle stony and inner fleshy layers.

832. Insectivorous plant usually survive in:

(a) water rich soil
(b) N_2 deficient soil
(c) N_2 rich soil
(d) sugar deficient medium

JCECE-2005

Ans. (b) : The insectivorous plants like Nepenthes, Drosera, etc, are autotrophic plants which behave as heterotrophic organisms as they trap N_2 from the insects which they catched. These plants usually survive in water logged or boggy habitats, which are deficient in nitrogen. These plants supplement their nitrogen supply through catching and digesting small animals like insects.

833. In which of the following the sporophyte is indeterminate in growth?

(a) Riccia (b) Marchantia
(c) Anthoceros (d) Funaria

VMMC-2006

Ans. (c) : In Anthoceros sporophyte is represented by foot, merismatic zone and capsule. The sporophte produces the spores in the capsule. The spores on germination produce the gametophyte. The sporophyte of Anthoceros shows indetermine growth and also cylindrical capsule with short foot.

834. Clear cut alternation of generations in present in:

(a) Rhizopus (b) Aspidium
(c) E. coli (d) Spirogyra

JIPMER-1995

Ans. (b) : Alternation of generations is present in Aspidium. The alternation of generations means that plants alternate between two different life stages, or generations, in their life cycle, a haploid stage called gametophyte and a diploid stage called sporophyte.

835. In plants, glycolate metabolism takes place in

(a) low concentration of CO_2
(b) high concentration of CO_2
(c) low concentration of oxygen
(d) absence of oxygen

VMMC-2005
AMU-2004

Ans. (a) : In low CO_2 concentration glycolic acid or glycolate is formed which forms the substrate for photorespiration or glycolate metabolism. It is energetically wasteful. Photo respiration is related with high O_2 and low CO_2 concentration.

836. Which of the following have gametuphytic plant body and sporophyte remains as a parasite on it?

(a) Funaria (b) Pteris
(c) Cycas (d) Neem

Rajasthan PMT-2000

Ans. (a) : In mosses, Funaria main plant body is gametophytic and sporophyte remains a parasite on gametophyte for nutrition.

- The sporophyte is the dominant generation, but multicellular male and female gametophytes are produced within the flowers of the sporophyte.

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04 ANIMAL KINGDOM

A. Basis of Classification

1. Study the following pick up the correct combinations

	Phylum	Salient feature	Example
I.	Porifera	Cnidoblasts	Sycon
II.	Cnidaria	Tissue level organisation	Adamsia
III.	Annelida	Malpighian tubules	Nereis
IV.	Echinodermata	Water vascular system	Antedon

(a) I, II (b) III, IV
(c) I, III (d) II, IV

TS EAMCET-10.05.2023, Shift-II

Ans. (d) :
Porifera → cnidoblast e.g. sycon
Echinodermata → water vascular system Antedon

Cnidaria is also called coelentrates.
Tissue lable body organisition and this is diploblostic
• The number of cnedaria is adomsia is also called sea anemon

2. Among triplolastic animals, these are asymmetrical
(a) Larvae of echinoderms
(b) Crustaceans
(c) Adult gastropods
(d) Ctenophores

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Adult gastropods are triplolastic animals and asymmetrical- The medium celled species of gastropods as abalone, periwinkles, whelks and numerous sea snails.
Torsion of body mass is present in gastropods and Radula is present and mostly median
• Ctenophore are diploblostic and bidadialy symmetrical

3. The cleavage pattern in Deuterostomia is
(a) Spiral and determinate
(b) Spiral and indeterminate
(c) Radial and indeterminate
(d) Radial and determinate

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : Clevage a series of mitotic divisions where by the enormous volume of egg cytoplasm is divided into numerous smaller nucleated cells. These cleavage stage cells are called- blastomeres.
Several types of cleavage symmetry seen in nature radial (echinoderms, amphibians), spiral (mollusks, annelids), bilateral (ascidians, tunicates), rotational (mammals).
In deuterostomes cleavage pattern is radial & indeterminate.
Radial– The cells divide such that seen cell in the top four cell plane is directly over one other cell in the bottom plane.
Indeterminate– Early embryonic cells retain capacity to develop into a complete embryo if isolated from other cells. Cleavage produces blastomeres which are qualitatively equipotential or totipotent. When they are isolated, they develop into complete embryos. This is because the fates of blastomeres are not predetermined in the early embryonic period. Vertebrates and certain invertebrates such as echinoderms which produce regulative type of eggs exhibit indeterminate cleavage.

4. Slowest and most primitive type of locomotion in Protozoan is
(a) Flagellar movement
(b) Amoeboid locomotion
(c) Ciliary locomotion
(d) Undular movements

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : Amoeboid locomotion– Movement of the animals is made by the throwing of pseudopodium, called amoeboid movement.
In the direction of movement of amoeba a new pseudopodium is formed and the pseudopodium at the opposite side gradually disappears.

5. Number of vertebrae that from the sacrum
(a) 5 (b) 12
(c) 7 (d) 1

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : Vertebrae are the 33 individual bones that interlock with each other to form the spinal column. The vertebrae are numbered and divided into regions- cervical, thoracic, lumber, sacrum, and coccyx.
The sacrum is made up of five fused vertebrae (S_1 to S_5). The sacrum and coccyx are weight-bearing spinal structures. Sacrum is a shield-shaped bony structure that is located at the base of the lumber vertebrae.

6. Among vertebrates, renal portal system is absent in
(a) Myxine, Macropus, Felis
(b) Columba, Hemidactylus, Panthera
(c) Pteropus, Elephas, Labeo
(d) Scoliodon, Rana, Antelopa

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : Renal portal system is absent in myxine, macropus, felis. Found in most vertebrates its function is to supply blood to renal tubules when glomular filtration is absent.

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7. Match the following

Larva		Phylum	
A.	Parrenchymula	**I.**	Ctenopohora
B.	Cydippid	**II.**	Annelida
C.	Miracidium	**III.**	Porifera
D.	Trochophore	**IV.**	Echinodermata
		V.	Platyhelminthes

(a) A-III, B-IV, C-V, D-I
(b) A-IV, B-I, C-V, D-II
(c) A-II, B-V, C-I, D-III
(d) A-III, B-I, C-V, D-II

TS EAMCET-11.05.2023, Shift-II

Ans. (d) :

A.	Parrenchymula	III.	Porifera
B.	Cydippid	I.	Ctenopohora
C.	Miracidium	V.	Platyhelminthes
D.	Trochophore	II.	Annelida

8. Assertion (A) : Radial symmetry is an advantage to sessile animals.
Reason (R) : They live water and respond equally to stimuli that arrive from all directions.
The correction option among the following is
(a) A and R are true, R is correct explanation for A
(b) A and R are true, but R is not correct explanation for A
(c) A is true. But R is false.
(d) A is false. But R is true.

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : When any plane passing through the central axis of the body divides the organism into two identical halves, it is called radial symmetry- e.g., coelenterates, ctenophores and echinoderms.
Radial symmetry is an advantage to sessile animals e.g.- coelenterates, sponges ctenophorans & echinoderms.
They live water and respond equally to stimuli that arrive from all directions.

9. All protostomes show
(a) Holoblastic, spiral, indeterminate cleavage
(b) Holoblastic, radial, determinate cleavage
(c) Holoblastic, spiral, determinate cleavage
(d) Holoblastic, radial, indeterminate cleavage

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : All protostomes shows holoblastic, spiral and determinate cleavage.
Holoblastic Cleavage– When the cleavage furrows divide to entire egg. It may be–
Equal– When the cleavage furrow cuts the egg into equal cells. It may be radially symmetrical, bilaterally symmetrical, spirally symmetrical or irregular.
Unequal– When the resultant blastomeres becomes unequal in size.
Spiral Cleavage– The cells divide at slight angles to one another; so that the none of the four cells in one plane of the eight cell stage is directly over a cell in the other plane.
Determinate– The developmental fate of each embryonic cell is established very early. If a cells isolated from the 4-cell stage the embryo will not fully develop. This is because the fate of each blastomere is predetermined in the early embryonic stage itself. Annelids, mollusks and ascidians which produce mosaic type of eggs exhibit determinate cleavage.

10. Hemozoin is
(a) Insoluble, crystalline substance released during malarial parasite infection
(b) Soluble, amorphous and released during pneumonia attack
(c) Antigen released by plasmodium
(d) Antibody released by malaria patient

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : Hemozoin is a waste product of blood feeding parasite such as malaria. It is insoluble, crystalline substance released during infection.

11. Select the set of characters equally shared by reptiles and aves among the following
(a) Pneumatic bones and powerful breast musculature
(b) Interclavicle, uricotelism and megalecithal eggs
(c) Urinary bladder and Furcula
(d) Furcula and keel

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : The made of fertilization in both reptiles and birds is internal. Both reptiles and birds lay eggs. Interclavicle bone, uricotelism and megalecithal eggs are equally spread characters of reptiles and aves.

12. Choose the common characters shown by the animals of classes Scyphozoa and Anthozoa
A. Mesoglea is non cellular with amoebocytes
B. Cnidocytes occur in ectoderm and endoderm
C. Germ cells are derived from endoderm
D. Coelenteron is undivided
(a) A, C (b) B, D
(c) B, C (d) C, D

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Common features of class scyphozoa and Anthozoa are– Cnidoblast occurs both in ectoderm and endoderm germ cells derived from endoderms. Both are exclusively marine.
Differences between class scyphozoa and anthozoa– In scyphozoans coeletron is divided into four chambers and some canals and mesoglea contains amoebocytes.
In anthozoans coelentron is divided into eight or more septa or mesenteries, and mesoglea contain connective tissue.

13. Match the following

	List-I		List-II
A	**Gorgonia**	**i**	**Marine leech**
B	**Pontobdella**	**ii**	**Sea Urchin**
C	**Balanus**	**iii**	**Sea Fan**
D	**Echinus**	**iv**	**Rock barnacle**

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(a) A – iii, B – i, C – iv, D – ii
(b) A – iii, B – iv, C – ii, D – i
(c) A – iv, B – i, C – ii, D – iii
(d) A – ii, B – iv, C – i, D – iii

AP EAPCET-23.05.2023, Shift-I

Ans. (d) :

A	Gorgonia	ii	Sea Urchin
B	Pontobdella	iv	Rock barnacle
C	Balanus	i	Marine leech
D	Echinus	iii	Sea Fan

14. Bilateral symmetry is observed in
A. Aterias
B. Bipinnaria
C. Adult gastropods
D. Auricularia larva
E. Brachiolaria larva
(a) B, C, E (b) A, C, D
(c) A, B, E (d) B, D, E

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : Bilateral symmetry is observed in Bipinnaria larva, Auricularia larva and Brachiolaria larva.
Bipinnaria is larva of starfish, Auricularia is the larval stage of sea cucumber and Barchiolaria larva is second stage larva of starfish.

15. Match the following

	List-I		List-II
A.	**Red panda**	**i**	**Grus leucogeranus**
B.	**Siberian crane**	**ii**	**Antelope cervicapra**
C.	**The black buck**	**iii**	**Sus salvanius**
D.	**Pygmy hog**	**iv**	**Ailurus ochraceus**

(a) A. iv B. i C. ii D. iii
(b) A. iii B. iv C. i D. ii
(c) A. ii B. i C. iv D. iii
(d) A. iii B. iv C. ii D. i

AP EAPCET-23.05.2023, Shift-I

Ans. (a) :

A.	Red panda	iv	Ailurus ochraceus
B.	Siberian crane	i	Grus leucogeranus
C.	The black buck	ii	Antelope cervicapra
D.	Pygmy hog	iii	Sus salvanius

16. Match the following:

	Excretory organs		Examples
(A)	**Protonephridium**	**(I)**	**Terrestrial arthropods**
(B)	**Malpighian tubules**	**(II)**	**Crustaceans**
(C)	**Pericardial glands**	**(III)**	**Amphibians**
(D)	**Antennary glands**	**(IV)**	**Rotifers**
		(V)	**Adult molluscs**

The correct match is
Options:

	A	B	C	D
(a)	IV	I	V	III
(b)	IV	I	V	II
(c)	III	I	IV	V
(d)	II	V	I	IV

TS EAMCET-30.07.2022 Shift-I

Ans. (b) :

Excretory organs		Example	
A	Protonephridium	IV	Rotifers
B	Malpighian tubules	I	Terrestrial Arthropods
C	Pericardial glands	V	Adult molluscs
D	Antennary glands	II	Crustaceans
		V	Amphibians

17. The lowest level of organization among eumetazoans is
(a) Cellular level (b) Tissue level
(c) Organ level (d) Organ–system level

TS EAMCET-30.07.2022 Shift-I

Ans. (b) : The lowest level of organization among eumetazoans is tissue level. These are found in coelente rates and ctenophores.
• Organ system level of organisation is seen in annelids, Arthropoda, Echinoderms, molluscs and chordates
• The celluar level of organization is found in the porifera phylum.

18. Match the following:

	List-I		List-II
(A)	**Choanocytes**	**(I)**	**Cnidaria**
(B)	**Lasso cells**	**(II)**	**Porifera**
(C)	**Stinging cells**	**(III)**	**Nematoda**
(D)	**Renette cells**	**(IV)**	**Ctenophora**
(E)	**Periostracum**	**(V)**	**Mollusca**

The correct match is:

	A	B	C	D	E
(a)	V	I	IV	II	III
(b)	II	IV	I	V	III
(c)	IV	III	II	I	V
(d)	II	IV	I	III	V

TS EAMCET-31.07.2022 Shift-II

Ans. (d) :

	List – I	List - II
A	Choanocytes	Porifera
B	Lasso cell	Ctenophora
C	Stinging cells	Cnidaria
D	Renette cell	Nematoda
E	Periostracum	Mollusca

19. The animals which are active during day time
(a) Vesporal (b) Diurnal
(c) Cresporal (d) Auroral

Karnataka CET-2022

Ans. (b) : Diurnal : Diurnal animal are animal that are active during the day and then sleep at night.
Example - Diurnal animal include Human, Deer, Dog, etc
Vesporal : Animal which remain active during dusk (late hour of day).
Example : Bat and Owls.
Cresporal : A Cresporal organism is one that is adapted specifically to run. An animal can be considered Cresporal if it has the ability to run fast.
Example : Cheetah.
Auroral : an auroral animal are those who remain active at dawn (early hours of the day).
Example: Bubalcus.

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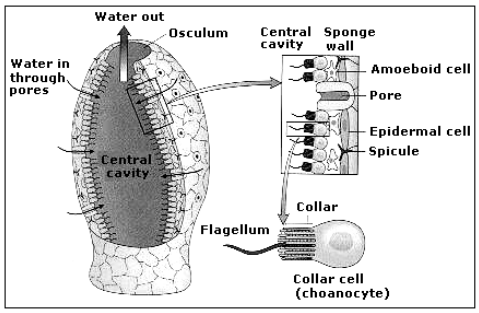
20. Multicellular animals that exhibit cellular level organisation are

(a) Protozoans (b) Metazoans
(c) Eumetazoans (d) Parazoans

TS EAMCET-30.07.2022 Shift-II

Ans. (d) : Parazoans are multicellular animals that exhibit cellular-level organization. The cellular level is the most basic level of organization. Sponges are the most common parazoa in the world.
An organism is organized into four level : cells, tissues, organs and organ systems.

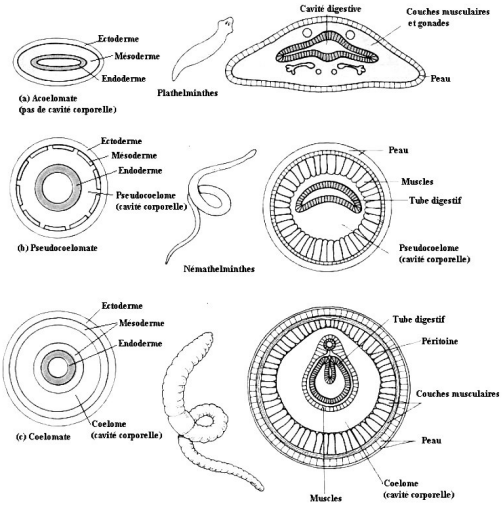


21. Which of the following groups constitutes eucoelomates?

(a) Acoelomates & Pseudocoelomates
(b) Schizocoelomates & Pseudocoelomates
(c) Schizocoelomates & enterocoelomates
(d) Enterocoelomates & Pseudocoelomates

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Animal that have a true coelom is known as Eucoelemate. Schizocoelomates and enterocoelomates are type of two categories of true coelom.



- Schizocoelomates is a coelom that originates from the splitting of the mesoderm creating the pocket-like cavity. e.g.- Annelids, Arthropods, and Molluscs.
- Enterocoelomates is a coelom formed from the wall of the embryonic gut or archenteron as hollow outgrowths. e.g.- Echinoderms, Hemichordates and Chordates.

22. The Scientific name of Rhesus monkey

(a) Macaca fascicularis (b) Macaca radiata
(c) Macaca mulatta (d) Macaca fuscata

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : The scientific name of Rhesus monkey is *Macaca mulatta*. It is a species of Old World monkey they live in groups of 20 to 200 animals and lives on the ground or in trees.
-*Macaca fascicularis* commonly called long tailed macaque or crab eating macaques
-*Macaca radiata* commonly called bonnet macaque also known as zati.
-*Macaca fuscata* commonly called Japanese macagues also known as the snow monkey.

23. Which scientist is regarded as the pioneer in the field of systematic of invertebrates?

(a) Libbie Henrietta Hyman (b) Heackle
(c) Leeuwenhoek (d) Robert E. Grant

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Libbie Henrietta Hyman born on Dec 6, 1888,, U.S and died Aug. 3,1969 New York city U.S zoologist and writer particularly noted for her widely used texts and reference work on invertebrate and vertebrate zoology. Libbie Henrietta Hyman is regarded as the pioneer in the field of systematic of invertebrates.

24. Read the following and find out the correct combinations

	Coelom/ Symmetry	Phylum	Example
(a)	Pseudocoelom	Platyhelminthes	Ascaris
(b)	Bilateral	Cnidaria	Hydra
(c)	Eucoelom	Annelida	Pheretima
(d)	Radial	Ctenophora	Obelia

TS EAMCET-30.07.2022 Shift-II

Ans. (c) : A coelom or the body cavity is important for the formation of complex organs. The organism without a body cavity cannot develop proper organs. The entire organism belonging to phylum annelida (Pheretima) posses coelom.

- True coelom or Eucoelom is a fluid-filled cavity. It is lined by mesodermal epithelium and develops within the mesoderm. It develops between alimentary canal and gut wall.
- Phylum Annelida is a very broad phylum belonging to the kingdom Animalia.

25. Match the following

Sub Division	Character	Example
A) Acoelomata	**i) Coelom is formed by archenteron**	**p) Mollusca**
B) Pseudocoelomata	**ii) Without a body cavity**	**q) Hemichordata**
C) Schizocoelomata	**iii) Body cavity should not lined by mesodermal layers**	**r) Nematoda**
D) Enterocoelomate	**iv) Coelom is formed by splitting of mesoderm**	**s) Platy helminthes**

(a) (A – ii – r), (B – iv– s), (C – iii – p), (D – i – q)
(b) (A – ii – s), (B – ii – r), (C – i – p), (D – iv – q)
(c) (A – ii – s), (B – iii – r), (C– iv – p), (D – i – q)
(d) (A – iii – s), (B –ii – r), (C – iv – p), (D – i – q)

AP EAMCET-06.09.2021 Shift-I

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Ans. (c):
Acoelomata – Animals in which body cavity is absent **e.g. - Platyhelminthes**.
Pseudocoelomata – The body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm.
e.g. - Nematodes (Aschelminthes).
Schizocoelomata – Coelom is formed by splitting of mesoderm **e.g.- Mollusca**.
Enterocoelomate – Coelom is formed by archenteron **e.g. - Hemichordata**.

26. Principal type of symmetry in triploblastic animals
(a) Asymmetry (b) Radial
(c) Bilateral (d) Biradial

TS EAMCET-09.08.2021 Shift-II

Ans. (c) : Triploblastic animals have three germs layers are ectoderm, endoderm and mesoderm and have a large diversity of body plans compared with diploblastic organisms because of the additional mesoderm layer. The majority of them are bilaterally symmetrical.

27. Match List I with List II and select the correct option from the codes given below?

	List I		List II
i	Nephridia	A	Coelenterata
ii	Comb plates	B	Platyhelminthes
iii	Choanocytes	C	Annelida
iv	Flame cells	D	Porifera
v	Cnidoblasts	E	Ctenophora

Options:
(a) (i-C), (ii-E), (iii-A), (iv-B), (v-D)
(b) (i-C), (ii-E), (iii-D), (iv-B), (v-A)
(c) (i-C), (ii-A), (iii-E), (iv-B), (v-D)
(d) (i-E), (ii-A), (iii-D), (iv-B), (v-C)

AP EAMCET-05.10.2021 Shift-I

Ans. (b) : Match List I with List II–

Nephridia	–	Annelida
Comb plates	–	Ctenophora
Choanocytes	–	Porifera
Flame cells	–	Platyhelminthes
Cnidoblasts	–	Coelenterata

28. Cold blooded animals fall under the category of _____
(a) Endotherms (b) Thermophiles
(c) Ectotherms (d) Psychrotherms

AP EAPCET-07.09.2021 Shift-I
DUMET-2010

Ans. (c) : Cold blooded animals fall under the category of ectotherms. e.g. Fishes, Amphibians and Replies.
- An ectotherm relies primarily on its external environment to regulate the temperature of its body.
- Birds and mammals are called endotherm.
  Endotherm is an animal that can control its internal body temperature endotherm body temperature usually much warmer than the temperature of environment. Endotherm are called warm blooded animals.
- Psychrotherms are Animals that lives in the cold.
- Thermophiles are animals that live in hot springs.

29. Identify the correct statements with reference to 'Enterocoelomates'.
A.) Body cavity is formed from endodermal pouches
B) They display determinate type of cleavage
C) Enterocoelomates are deuterostomes
D) Hemichordates are enterocoelomates
(a) A & B (b) B & C
(c) C & D (d) A & C

TS EAMCET-09.08.2021 Shift-I
TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Enterocoelomates are deutrostomes.
- Hemichordates are enterocoelomates.
- Body cavity is formed from mesoderm lined.
- They display radial and in determinate cleavage.

30. Coelomate animal in which blastopore develops into anus is called
(a) proterostomia (b) deuterostomia
(c) blastostomia (d) diastomia
(e) None of these

CMC Vellore-2010, 2015
AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Deuterostomia : Based on the embryonic development metazoans are divided into protostomes and deuterostomes.
- Deuterostome include chordate and echinodermata the blastopore in deuterostome is develop into an anal opening.

Protostomia : protostome are primitive invertebrates blastopore in protostome are developed into a mouth.
Example : Arthropods, molluscs, annelids, flatworms and nematodes.

31. Read the following statements
(A) Metagenesis is observed in Helminths.
(B) Echinoderms are triploblastic and coelomate animals.
(C) Round worms have organ-system level of body organization.
(D) Comb plates present in ctenophores help in digestion.
(E) Water vascular system is characteristic of Echinoderms.
Choose the correct answer from the options given below.
(a) (B), (C) and (E) are correct
(b) (C), (D) and (E) are correct
(c) (A), (B) and (C) are correct
(d) (A), (D) and (E) are correct

NEET-2021

Ans. (a) : Echinoderms are triploblastic and coelomate animals as true coelom is observed in them.
- **Roundworms** (Aschelminths) have organ system level of organization.
- **Water vascular system** is seen in echinoderms. It helps in locomotion, capture and transport of food and respiration.
- **Comb plates** present in ctenophores help in locomotion.
- Alternation of generation is also known as metagenesis. It is observed in members of phylum coelenterata (cnidaria).

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32. Match List - I with List - II

List - I		List - II	
(A)	**Metamerism**	**(i)**	**Coelenterata**
(B)	**Canal system**	**(ii)**	**Ctenophora**
(C)	**Comb plates**	**(iii)**	**Annelida**
(D)	**Cnidoblasts**	**(iv)**	**Porifera**

Choose the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(iv)	(i)	(ii)	(iii)
(b)	(iv)	(iii)	(i)	(ii)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(iii)	(iv)	(ii)	(i)

NEET-2021

Ans . (d) :

	List-I		List-II
(A)	Metamerism	(iii)	Annelida
(B)	Canal system	(iv)	Porifera
(C)	Comb plates	(ii)	Ctenophora
(D)	Cnidoblasts	(i)	Coelenterata

Metamerism– It is the repetition of homologous body segments.
Canal System– It also called aquiferous system. It is characterstics feature of phylum porifera.
Comb Plates– It is large ciliary structure found in phylum ctenophora.
Cnidoblasts– It is secretory organs occurs in phylum coelenterate. They play important role in offens and defens and attachment of substratum.

33. Within the kingdom animalia, which one of the following features is primarily used for classification of the organisms?

(a) Body symmetry (b) Habitat
(c) Mode of nutrition (d) Locomotory organs

KVPY (SA)-2021

Ans. (a) : Within the kingdom animalia, Body symmetry is primary used for classification of the organism. Generally animals show two types of symmetry-
(A) Radial symmetry:- When any plane passing through the central axis divides the body into two equal halves is called radial symmetry.
eg:- Coelentrates, Ctenophores and Echinoderms
(B) Bilateral symmetry:- When only a single plane divides the body into equal halves is called Bilateral symmetry.
eg:- Annelida, Arthropoda, mollusca etc.
Phylum protozoa classified on the basis of locomotion.

34. Which one of the following is the correct structural organization of any animal?

(a) Tissues → Organs → Systems → Cells
(b) Cells → Tissues → Organs → Systems
(c) Cells → Organs → systems → Tissues
(d) Systems → Organs → Cells → Tissues

MHT CET 5.10.2020 Shift-I

Ans. (b) : Cells → Tissues → Organs → Systems is the correct structural organization of any animal. In animal is starts from the smallest fundamental unit is called cell.
Cell :- It is the smallest fundamental unit.
Tissue:- A group of similar cells called tissue.
Organ:- A collection of tissue known as organ.
System:- A group of organs that perform a function.

35. Match the following columns and select the correct option :

Column – I		Column–II	
A.	**Aptenodytes**	**i**	**Flying fox**
B.	**Pteropus**	**ii**	**Angel fish**
C.	**Pterophyllum**	**iii**	**Lamprey**
D.	**Petromyzon**	**iv**	**Penguin**

(a) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(b) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

NEET-2020 Phase-II

Ans. (d) :

(A)	Aptenodytes	(iv)	Penguin
(B)	Pteropus	(i)	Flying fox
(C)	Pterophyllum	(ii)	Angel fish
(D)	Petromyzon	(iii)	Lamprey

36. Match the following columns and select the correct option.

Column-I		Column-II	
(A)	**Gregarious, polyphagous pest**	**(i)**	**Asterias**
(B)	**Adult with radial symmetry and larva with bilateral symmetry**	**(ii)**	**Scorpion**
(C)	**Book lungs**	**(iii)**	**Ctenoplana**
(D)	**Bioluminescence**	**(iv)**	**Locusta**

	(A)	(B)	(C)	(D)
(a)	(iv)	(i)	(ii)	(iii)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(ii)	(i)	(iii)	(iv)
(d)	(i)	(iii)	(ii)	(iv)

NEET-2020 Phase-I

Ans. (a) :

(A)	Gregarious, Polyphagous Pest	Locusta
(B)	Adult with radial symmetry and larva with bilateral symmetry	Asterias
(C)	Book lungs	Scorpion
(D)	Bioluminescence	Ctenoplana

37. Identify the incorrect statement (s) from the following:

(a) Labrum is called lower lip
(b) Hind wings (mesothoracic) called tegmina.
(c) Gizzard in alimentary canal is also called proventriculus.
(d) Exchange of gases take place at the tracheoles by active process.
(e) The opening of the spiracles is regulated by the sphincters

(a) (a), (b), (c) and (d)
(b) only (a), (b), (d)
(c) only (a)
(d) only (b), (c)

AP EAMCET-25.09.2020 Shift-I

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Ans. (b) :
(a) Labrum : The labrum is also known as the upper lip. It consist of a flattened cuticle and help to hold the food in the correct position when the cockroach feed.
(b) Metathoracic : Hind wing called metathoracic wing which are delicate thin transparent and membranous wing with broad terminal end. They are used for flight.
(d) Exchange of the gases in cockroach take place in tracheoles by the process of diffusion.

38. Study the following statements :
I. Sponges are considered as an evolutionary blind offshoot.
II. In anthozoans, germ cells are derived from ectoderm
III. Primary function of flame cells of flatworms is osmoregulation.
IV. Body cavity of nematodes contain botryoidal tissue.
Among the above, the correct statements are:
(a) I,II (b) I, III
(c) III, IV (d) II, IV

TS EAMCET-28.09.2020 Shift-II

Ans. (b) : Sponges are not considered as an evolutionary to higher phyta.
Germ cell : Embryonic germ cell are pleuripotent stem cell derived from primordial germ cell.
Botryoidal tissue : In leeches the botryoidal tissue is composed of two different cell types granular botryoidal cell and flattened endothelial like cell.

39. Statement I : Sternum appeared for the first time in amphibians.
Statement II : Snakes have 10 pairs of cranial nerves.
The correct option among the following is
Options:
(a) Statements I and II are true.
(b) Statements I and II are false.
(c) Statement I is true. But II is false.
(d) Statement I is false. But II is true.

TS EAMCET-28.09.2020 Shift-I

Ans. (a) : The sternum also known as the breast bone, is a flat bone located in the middle of the rib cage and chest areas. Amphibians are first tetrapods and leud a dual mode of life on land and fresh water.
Sternum appeared for the first time in the amphibians.
- Cranial nerves are 12 pairs in reptiles, except in snakes (10 pairs).

40. Study the following and pick up the correct statements:
(I) Aristotle's lantern is found in echinoids
(II) Glochidium is the larva of cephalopods
(III) Scorpions respire with book lungs.
(IV) Parapodia are found in oligochaetes
Options:
(a) I, III (b) I, II
(c) III, IV (d) II, IV

TS EAMCET-28.09.2020 Shift-I

Ans. (a) : According to the question correct statement is
(1) Aristotles lantern is found in echinoids
(2) Glochidium is the larva of freshwater mussels (unio)
(3) Scorpions respire with book lungs.
(4) Parapodia are found in Annelids but some annelids such as earthworms belonging to the subclass Oligochaeta lack parapodia.

41. Follow the statements given below
I. Haemocoel in arthopods is around gonads and excretory organs.
II. Haemocoel in molluscs is around kidneys, visceral organs and gonads.
III. Coelom in echinoderms is modifed into an ambulacral system.
IV. Functional body cavity in annelids is the secondary body cavity.
Find out the correct statements from the above
(a) Only I and II are correct
(b) Only III and IV are correct
(c) Only I, II and IV are correct
(d) I, II, III and IV are correct

TS EAMCET-29.09.2020 Shift-I

Ans. (b) : The correct statement is –
(III) Coelom in echinoderms is modified into an ambulacral systems.
(IV) Functional body cavity in annelids is the secondary body cavity.

42. Identify wrongly matched Scientific name and common name:

	Scientific name	Common name
a.	**Bungarus**	**Krait**
b.	**Exocoetus**	**Flying fish**
c.	**Trygon**	**Electric ray**
d.	**Carcharodon**	**Dog fish**
e.	**Myxine**	**Hagfish**

(a) Only (c), (d) (b) (a),(b),(c) and (e)
(c) Only (c) (d) Only (d)

AP EAMCET-24.09.2020 Shift-I

Ans. (d) :

Scientific Name		Common Name
Bungarus	-	Krait
Exocoetus	-	Flying fish
Myxine	-	Hagfish
Trygon	-	Electric ray
Carcharodon Carcharias	-	Great white shark
Squalus acanthias	-	Dog fish

43. The 'Coelom' was coined by _____
(a) Bentham (b) Haeckel
(c) Robert Brown (d) Robert Hooke

AP EAMCET-25.09.2020 Shift-I

Ans. (b) : Term coelom was coined by Haeckel.
- The term was coined in 1872, between the alimentary canal and the body wall lined on all sides by mesoderm.
- The nucleus of the cell was discovered by Robert Brown
- The cell was first discovered and named by Robert Hooke in 1665 (In dead cell wall of plant cells (cork))
- Bentham is known as father of Jurisprudence.

44. Identify the common features of Saccoglossus, Cucumaria, Chaetopleura
(1) Bilaterally symmetrical. They are triploblasitc and coelomate animals
(2) Development is indirect

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(3) Presence of water vascular system which helps in locomotion
(4) Excretory system is absent. Sexes are separate
(a) 1 and 2 (b) 1
(c) 2 and 4 (d) 1, 2, 3 and 4

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : The common features of saccoglossus, cucumaria, chaetopleura are bilaterally symmetrical, they are triploblastic and coelomate animals, development is indirect.
- Presence of water vascular system which helps in locomotion found in echinodermata.
- In Echinodermata excretory system is absent and sexes are separate.

45. Match the species in Column I with their respective feature of body organization in Column II.

Column-I	Column-II
P. Mollusca	i. Pseudocoelom
Q. Annelida	ii. Radula
R. Nematoda	iii. Radial symmetry
S. Echinodermata	iv. Segmentation

Choose the correct combination.
(a) P-ii, Q-i, R-iv, S-iii (b) P-ii, Q-iv, R-i, S-iii
(c) P-iii, Q-iv, R-i, S-ii (d) P-iv, Q-iii, R-ii, S-i

KVPY (SA)-2020

Ans. (b) :

Column -I	Column-II
P) Mollusca	(ii) Radula
Q) Annelida	(iv) segmentation
R) Nematoda	(i) Pseudocoelom
S) Echinodermata	(iii) Radial symmetry

46. Bilaterally symmetrical and acoelomate animals are exemplified by
(a) Platyhelminthes (b) Aschelminthes
(c) Annelida (d) Ctenophora

NEET-2020 Phase-I

Ans. (a) : Flatworms or platyhelminthes are bilaterally symmetrical and acoelomate animals.
- Annelida is triploblastic, bilaterally symmetrical and coelomates.
- Aschelminthes are pseudocoelomate animals.
- Ctenophora are radially symmetrical with no coelom.

47. Which one of the following phyla is a pseudocoelomate?
(a) Cnidaria (b) Nematoda
(c) Mollusca (d) Chordata

KVPY SB & SX-2019

Ans. (b) : Pseudocoelomate is also known as false coelom. It is occurs in Nematodes organs are less organized inside the pseudocoelom. Pseudocoelomate body cavity present but incompletely lined with mesoderm.

48. Match the following genera with their respective phylum :
(A) Ophiura (i) Mollusca
(B) Physalia (ii) Platyhelminthes
(C) Pinctada (iii) Echinodermata
(D) Planaria (iv) Coelenterata
Select the correct option :
(a) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(b) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)

NEET (Odisha)-2019

Ans. (c) : Ophiura ophiura or the serpent star is a species of brittle star in the order Ophiurida- related to phylum
- **Echinodermata**. It is typically found on coastal seabeds around northwestern Europe.
- **The physalia** also known as the man-of-war, belongs to the phylum **coelenterata**, is a marine hydrozoan found in the Atlantic Ocean and the Indian Ocean .
- **Pinctada** is a genus of saltwater Oysters, marine bivalve mollusca in the family pteridae, belongs to phylum **Mollusca**. There pearl oysters have a strong inner shell layer composed of nacre, also known as "mother of pearl".
- **Planarian**, (class turbellaria), any of a group of widely distributed mostly free living flatworms of the class turbellaria (phylum **platyhelminthes**).

49. Match the following organisms with their respective characteristics :

A.	**Pila**	**i.**	**Flame cells**
B.	**Bombyx**	**ii.**	**Comb plates**
C.	**Pleurobrachia**	**iii.**	**Radula**
D.	**Taenia**	**iv.**	**Malpighian tubules**

Select the correct option from the following :

	A	B	C	D
(a)	(iii)	(iv)	(ii)	(i)
(b)	(ii)	(iv)	(iii)	(i)
(c)	(iii)	(ii)	(iv)	(i)
(d)	(iii)	(ii)	(i)	(iv)

NEET-2019

Ans. (a) : Pila → Radula
Bombyx → Malpighian tubules
Pleurobrachia → Comb plate
Taenia → Flame cell
- Pila or apple snail contain file like rasping organ called radula.
- Bombyx or silkworm is an arthropod in which excretion occur through malpighian tubules.
- The body of ctenophore pleurobranchia bears eight row of ciliated comb plate which help in locomotion.
- In Taenia, excretion occur through specialised cells called flame cells, which contain a protonephridia.
- These are mostly endoparasite found in animal including human.

50. Statement (S): Bilaterally symmetrical animals are less efficient than the other animals in seeking food and locating mates because of cephalization.
Reason (R) : Cephalization is developed in bilaterally symmetrical animals.
The correct answer is
(a) Both (S) and (R) are correct and (R) is the correct explanation to (S).

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(b) Both (S) and (R) are correct but (R) is not the correct explanation to (S).
(c) (S) is correct but (R) is not correct
(d) (S) is not correct but (R) is correct

TS EAMCET-09.05.2019 Shift-I

Ans. (d) : Advance cephalized animals have a head and brain, while less cephalized animals display one or more regions of nervous tissue. Cephalization is associated with bilateral symmetry and movement with the head facing forward. Bilaterally symmetrical animals can seek food, locate mate, escape from predators, and move more efficiently.
Thus statement (S) is not correct but reason (R) is correct.

51. Consider following features
(A) Organ system level of organisation
(B) Bilateral symmetry
(C) True coelomates with segmentation of body
Select the correct option of animal groups which possess all the above characteristics
(a) Annelida, Arthropoda and Mollusca
(b) Arthropoda, Mollusca and Chordata
(c) Annelida, Mollusca and Chordata
(d) Annelida, Arthropoda and Chordata

NEET-2019

Ans. (d) : Annelida, Arthopoda and chordata posses following characteristics-
- They have organ system level of body organization, bilateral symmetry and true coelom.
- Coelom is fluid filled cavity between alimentary canal and bodywall
- It is lined on all sides by mesoderm.

52. Match the following :

	Set-I		Set-II
A.	**Acoelomate**	**I.**	**Earth worm**
B.	**Pseudocoelomate**	**II.**	**Acorn worm**
C.	**Schizocoelomate**	**III.**	**Tape worm**
D.	**Enterocoelomate**	**IV.**	**Round worm**

The correct match is

	A	B	C	D
(a)	II	I	III	IV
(b)	III	IV	I	II
(c)	I	II	IV	III
(d)	II	III	IV	I

TS EAMCET-08.05.2019 Shift-I

Ans. (b) :

	Set-I		Set-II
A	Acoelomate	III	Tape worm
B	Pseudocoelomate	IV	Round worm
C	Schizocoelomate	I	Earth worm
D	Enterocoelomate	II	Acorn worm

53. Statement (S) : Symmetry of an organism is determined based on the symmetry of the early developmental stages and not that of the adults.
Reason (R) : Bilaterally symmetrical animals are more efficient in seeking food, locating mates and avoiding predators.
Which of the following is true?
(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : An organism starts as a single cell and has to organize itself and its genetic material in a symmetrical way to ensure that each daughter cell has a copy of each gene before it splits.
The bilaterally symmetrical animal can seek food and locate mates, escape from predators, and move more efficiently.

54. Match the following :

List-I	List-II
(A) Chordata	**(i) Acoelomate**
(B) Nematoda	**(ii) Schizocoelomate**
(C) Mollusca	**(iii) Enterocoelomate**
(D) Platyhelminthes	**(iv) Pseudo coelomate**

The correct answer is

	A	B	C	D
(a)	(i)	(iii)	(ii)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(ii)	(iv)	(iii)	(i)

TS EAMCET-02.05.2018 Shift-II

Ans (b):

	List – I	List - II
a.	Choradata	Enterocoelomate
b.	Nematoda	Pseudocoelomate
c.	Mollusca	Schizocoelomate
d.	Platyhelminthes	Acoelomate

55. Match the following

	List-I		List-II
(A)	**Trichimella**	**(I)**	**Platyhelminthes**
(B)	**Redia**	**(II)**	**Mollusca**
(C)	**Trochophore**	**(III)**	**Echinodermata**
(D)	**Glochidium**	**(IV)**	**Porifera**
		(V)	**Annelida**

	A	B	C	D
(a)	IV	III	V	II
(b)	II	V	I	IV
(c)	IV	I	V	II
(d)	III	II	I	V

AP EAMCET-25.04.2018 Shift-I

Ans. (c) :
Trichimella - Porifera.
Redia - Platyhelminthes
Trochophore - Annelida
Glochidium - Mollusca

56. Animals living in air-water interface
(a) Nekton (b) Periphyton
(c) Plankton (d) Neuston

AP EAMCET-25.04.2018 Shift-I

Ans. (d) : Neuston (or swimmers) are living organism that are able to swim and move independently of currents. Neuston are group of organism found on top of underside of the surface of film of water
Example : floating plant

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Plankton : Zooplankton include microscopic animals (krill, sea snails, pelagic worm, etc.) some example of plankton include - diatoms, jelly-fish dinoflagellates. This is also includes microscopic plants like algae called phytoplankton.

57. Match the following

List-I	List-II
(p) Crab	(i) Green glands
(q) Dugesia	(ii) Malpighian tubules
(r) Wuchereria	(iii) Renette glands
(s) Scolopendra	(iv) Flame cells

The correct answer is

	(p)	(q)	(r)	(s)
(a)	(ii)	(iii)	(iv)	(i)
(b)	(i)	(iii)	(iv)	(ii)
(c)	(i)	(iv)	(iii)	(ii)
(d)	(i)	(ii)	(iii)	(iv)

TS EAMCET-02.05.2018 Shift-I

Ans. (c) :

Crab	–	Green gland
Dugesia	–	Flame cell
Wuchereria	–	Renette gland
Scolopendra	–	Malpighian tubules

58. Statement (S) : Symmetry of an organism is determined based on the symmetry of the early developmental stages and not that of the adults.
Reason (R) : Bilaterally symmetrical animals are more efficient in seeking food, locating mates and avoiding predators.
Which of the following is true?

(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Symmetry of an organism is determined based on the symmetry of the early developmental stages and not that of the adults because radial symmetry is not found in adult of the phylum hemichordate.

Bilaterally symmetry: the bilaterally symmetrical animals can seek feed, ldcate mates, escape from predaters and move more efficiently. These animals have dersal ventral sides and anterior, posterior ends, right and left sides.

Example of animal that possess bilateral symmetry : Flatworms, common worm (ribbon worm) clams snails, octopus, crustacean insects, spiders, sea stars, sea urchins and vertebrates.

59. Which of the following animals does not undergo metamorphosis?

(a) Earthworm (b) Tunicate
(c) Starfish (d) Moth

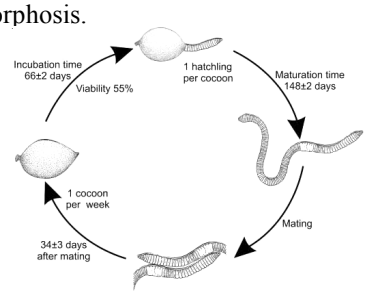
NEET-2018

Ans. (a) : Earthworm do not have larval stage it exhibit direct development.

• Grasshopper does not go under metamorphosis.

Metamorphosis refers to transformation of larva into adult, animal, that perform metamorphosis are said to have indirect development.

• Some insect, fish, amphibians, mollusca, crustaceans, cnidarians, echinoderms and tunicate undergo metamorphosis.



60. Match the following

	List- I		List-II
(p)	Asymmetry	(i)	Cnidaria
(q)	Radial symmetry	(ii)	Platyhelmenthes
(r)	Bilateral symmetry and Enterocoelom	(iii)	Porifera
(s)	Bilateral symmetry without body cavity	(iv)	Hemichordata

The correct answer is

	(p)	(q)	(r)	(s)
(a)	(i)	(iii)	(iv)	(ii)
(b)	(ii)	(i)	(iii)	(iv)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(iii)	(i)	(iv)	(ii)

TS EAMCET-02.05.2018 Shift-I

Ans. (d) :

	List-I	List-II
p	Asymmetry	Porifera
q	Radial symmetry	Cnidaria
r	Bilateral symmetry and enterocoelom	Hemichordata
s	Bilateral symmetry without body cavity	Platyhelmenthes

61. Match the following

List-I		List-II	
A.	Chordata	(i)	Acoelomate
B.	Nematoda	(ii)	Schizocoelomate
C.	Mollusca	(iii)	Enterocoelomate
D.	Platyhelminthes	(iv)	Pseudo coelomate

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The correct answer is

	A	B	C	D
(a)	(i)	(iii)	(ii)	(iv)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(ii)	(iv)	(iii)	(i)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) :

	List-I	List-II
A	Chordata	Enterocoelomate
B	Nematoda	Pseudocoelomate
C	Mollusca	Schizocoelomate
D	Platyhelminthes	Acoelomate

62. Which of the following is an acoelomate

(a) Ascaris lumbricoides (b) Taenia solium
(c) Enterobius (d) Nereis

TS EAMCET-03.05.2018 Shift-I

Ans. (b) : Taenia solium is acoelomate.

- Taenia solium belongs to the phylum platyhelminthes.
- It is commonly known as the Pork tapeworm.
- It live inside the human body.
- Ascaris lumbricoides is pseudocoelomates .
- Enterobius (pinworm) is pseudocoelomate.
- Nereis is coelomate.

63. Match the following

Cells of fat body		Function
(A) Trophocytes	(I)	Store uric acid
(B) Mycetocytes	(II)	Synthesis and storage of lipids
(C) Oenocytes	(III)	Storage of urea
(D) Urate cells	(IV)	Storage of food
	(V)	Store symbiotic bacteria

The correct answer is

Options :

	A	B	C	D
(a)	III	IV	V	I
(b)	IV	V	III	II
(c)	IV	III	V	I
(d)	IV	V	II	I

AP EAMCET-28.04.2017 Shift-I

Ans. (d) :

Cell of fat body Function

Trophocytes – Storage of food
Mycetocytes – Store symbiotic bacteria
Oenocytes – Synthesis of and storage of lipids
Urate cells – Store uric acid

- Tropocytes (adipocytes) are major cell of a storage organ the fat body from which stored glycogen and lipids are mobilized under starvation.
- Insect have special cells called mycetocytes that harbour symbiotic microorganism.
- Oenocytes are a cell type of ectodermal origin that displayed marked evolutionary variations in size, number and anatomical location across insecta.

64. Match the following

List–I		List–II	
A.	Enterocoelom	I.	Cnidaria
B.	Coelenteron	II.	Echinodermata
C.	Haemocoelom	III.	Nematoda
D.	Pseudocoelom	IV.	Arthropoda
		V.	Annelida

The correct answer is

Options:

	(A)	(B)	(C)	(D)
(a)	II	IV	III	V
(b)	II	I	IV	III
(c)	II	III	V	IV
(d)	III	II	I	IV

AP EAMCET-28.04.2017 Shift-II

Ans. (b) :

	List-I	List-II
A	Enterocoelom	Echinodermata
B	Coelenteron	Cnidaria
C	Haemocoelom	Arthropoda
D	Pseudocoelom	Nematoda

65. Match the following

Set - I	Set - II
(A) Flame cells	(I) Arthropods
(B) Coiled tubules	(II) Platyhelminthes
(C) Malpighian tubules	(III) Crustcean
(D) Green glands	(IV) Annelids

Identify the correct match between Set I and Set II

	A	B	C	D
(a)	II	IV	I	III
(b)	I	II	IV	III
(c)	III	IV	I	II
(d)	IV	III	II	I

TS EAMCET-12.05.2017

Ans. (a) :

	Set – I	Set – II
A	Flame cells	Platyhelminthes
B	Coiled tubules	Annelids
C	Malpighian tubules	Arthropods
D	Green glands	Crustcean

66. Match the following

Pseudopodium	Examples
(A) Lobopodia	(I) Elphidium
(B) Reticulopodia	(II) Actinophrys
(C) Filopodia	(III) Polytoma
(D) Heliopodia	(IV) Entamoeba
	(V) Euglypha

The correct answer is

Options :

	A	B	C	D
(a)	IV	I	V	II
(b)	II	V	I	IV
(c)	IV	I	V	III
(d)	IV	II	V	I

AP EAMCET-28.04.2017 Shift-I

@apna_pdf

Ans. (a) :

Pseudopodium	Examples
A) Lobopodia	(IV) Entamoeba
B) Reticulopodia	(I) Elphidium
C) Filopodia	(V) Euglypha
D) Heliopodia	(II) Actinophrys

67. Among the following edible fishes, which one is a marine fish having rich source of omega-3 fatty acids?

(a) Mystus (b) Mangur
(c) Mrigala (d) Mackerel

NEET-2016 Phase-II

Ans. (d) : Mackerel is marine fish rich in omega -3 fatty acids. Indian Mackerel is a species of Mackerel in the scombrid-family of order-perciformes. It is also known as Bangada, Kembung, and Aiyla is categorised in pelagic fishes. Generally used as sea food.

- Mystus native to Asia, popular due to its good taste.
- Mangur also known as walking catfish. Since it is carcinogenic fish doctors suggest avoid eating it.
- Mrigala carp also known as white carp.

68. A coelom (body cavity) derived from blastocoel is known as

(a) Schizocoel (b) Enterocoelom
(c) Haemocoel (d) Pseudocoelom

UP CPMT-2013
Uttarakhand PMT-2010

Ans. (d) : Pseudocoelom is a body cavity lying inside the body wall of certain organisms like the nematodes. It helps in circulation of nutrients and maintains a hydrostatic pressure.

69. Match List I with List II and select the correct option

List-I	List-II
A. Protozoa	**1. Pennatula**
B. Aschelminthes	**2. Beroe**
C. Porifera	**3. Monocystis**
D. Ctenophora	**4. Wuchereria**
E. Cnidaria	**5. Cliona**

(a) A-3, B-5, C-4, D-1, E-2
(b) A-4, B-3, C-5, D-2, E-1
(c) A-3, B-4, C-5, D-2, E-1
(d) A-2, B-4, C-5, D-3, E-1
(e) A-3, B-4, C-5, D-1, E-2

Kerala PMT-2008

Ans. (c) :

List-I	List-II
A) Protozoa	Monocystis
B) Aschelminthes	Wuchereria
C) Porifera	Cliona
D) Ctenophora	Beroe
E) Cnidaria	Pennatula

70. Body cavity lined by mesoderm is:

(a) coelom (b) coelenterons
(c) blastocoel (d) all of these

J&K CET- 2005, 2002

Ans. (a) : Body cavity lined by mesoderm is coelom. In the embryonic stage, three germs layers are found. these three germ layers are-
(1) ectoderm
(2) Endoderm
(3) Mesoderm.
Those animal in which all 3 layers are present are called triploblastic animal eg- chordata.
In most animal body cavity forms from these 3 layers which is lined by mesoderm epithelial cells. This body cavity is called coelom. On the basis of coelom animals are divides in 3 categories.
(1) Acoelomates (No coelom)
(2) Coelomates (true coelomates)
(3) Pseudocoelomates (false coelomates)

71. Which one of the following features is common to leech, cockroach and scorpion?

(a) Nephridia (b) Ventral nerve cord
(c) Cephalization (d) Antennae

Assam CEE-2014

Ans. (b) : Ventral nerve cord is common to leech, Cockroach and Scorpion. It is the functional equivalent of the vertebrae spinal cord. It consists of the subesophageal ganglion in the head & connected to the brain by circumesophageal connectives.

72. The lower Jaw of a mammal is made up of:

(a) dentary (b) maxilla
(c) Premaxilla (d) Post maxilla

BVP-2001

Ans. (a) : The lower Jaw of a mammal is made up of to dentary in ancestral animal.
In mammals the dentary consist of only one bone while in Reptiles it consists of several bones.
In mammals the upper Jaw is made up of the maxillary while the lower Jaw is known as the mandible.
• It helps in chewing.

73. Match List I with List II and choose the correct option

List-I (Organism)	List-II (Excretory Structure)
1. Cockroach	**A. nephridia**
2. Clarias	**B. malpighian tubules**
3. Earthworm	**C. kidneys**
4. Balanoglossus	**D. flame cells**
5. Flatworm	**E. proboscis gland**

(a) 1 - A, 2 - C, 3 - B, 4 - D, 5 - E
(b) 1 - C, 2 - A, 3 - B, 4 - E, 5 - D
(c) 1 - B, 2 - A, 3 - C 4 - E, 5 - D
(d) 1 - B, 2 - A, 3 - E, 4 - C, 5 - D
(e) 1 - B, 2 - C, 3 - A, 4 - E, 5 - D

Kerala PMT-2009

Ans. (e) :

	List-I corganism		List-II (Excretory structure)
1	Cockroach	B	Malpighian tubules
2	Catfish	C	Kidneys
3	Earth worm	A	Nephridia
4	Balanoglossus	E	Proboscis gland
5	flat worm	D	Flame cell

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Malpighian Tubules– Main excretory organ in insects.
Kidneys– It filter urea & other waste products from the blood.
Nephridia– It remove metabolic waste from the body.
Proboscis Gland– Excretory organ of Hemichordata.
Flame Cell– Occurs in platyhelminthes. It is also known as solenocytes.

74. Read the following statements and select the not correct option
(i) Circulatory system in arthropods is of closed type
(ii) Parapodia in annelids help in swimming
(iii) Phylum Molluscs is the second largest animal phylum
(iv) Aschelminthes are dioecious
(a) i and iii alone are wrong
(b) i alone is wrong
(c) iii alone is wrong
(d) iii and iv alone are wrong
(e) ii alone is wrong

Kerala PMT-2012

Ans. (b) :
(I) Circulatory system in Arthropoda is of Open type
(II) Parapodia in annelida help in crawing and swimming
(III) Phylum mollusca is the second largest animal phylum (phylum Arthropoda is largest animal phylum)
(IV) Aschelminthes are dioecious, pseudocoelomate.

75. Which of the following characteristics is mainly responsible for diversification of insects on land?
(a) Bilateral symmetry (b) Exoskeleton
(c) Eyes (d) Segmentation

AIPMT-2015

Ans. (b) : Insects belong to the largest phylum of Arthopoda. Insects have three parts of the body head, thorax, and abdomen. The most important adaptation is the exoskeleton. Insect exoskeleton is made up of chitin which help to prevent their skin from drying and also helps to maintain the moisture of insects skin.

76. Which of the following diseases is caused by a protozoan?
(a) Blastomycosis (b) Syphilis
(c) Influenza (d) Babesiosis

AIPMT (Re-Exam)-2015

Ans. (d) : Babesiosis is caused by microscopic parasites that infect red blood cells and are spread by certain ticks. Babesiosis is caused by apicomplexan parasites of the genus, Babesia. The symptoms of babeiosis are fever, chills, sweats, fatigue etc. It causes flu-like symptoms and can lead to severe illness.

77. Biradial symmetry and lack of cnidoblasts are the characteristics of-
(a) Starfish and sea anemone.
(b) Ctenoplana and Beroe.
(c) Aurelia and Paramecium.
(d) Hydra and starfish

AIPMT-2006
CMC Vellore-2012
JCECE-2013

Ans. (b) : Biradial symmetry and lack of cnidoblasts are the characteristics of Ctenoplana and Beroe.
- Biradial symmetry is a combination of radial and bilateral symmetry.
- Biradial symmetry is found in organism which shows morphological features of both bilateral and radial symmetry.
- Biradial organisms can only be cut along the two planes (longitudinal and transverse plane) equally.
- Ctenoplana is a marine solitary planktonic ctenophore. The ctenoplanidae family has only one genus, ctenoplana.
- Beroe cucumis has a transparent, sac like body, often somewhat compressed and reaches a maximum length of about 15 cm.

78. Which one of the following has an open circulatory system?
(a) Pheretima (b) Periplaneta
(c) Hirudinaria (d) Octopus

AIPMT-2006

Ans. (b) : *Periplaneta* has an open circulatory system cockroach has 13 chambered tubular heart which is filled with oxygenated blood.
- The American cockroach, periplaneta americana, is the largest of the common peridomestic cockroaches measuring an average 4 cm in length. It comes under phylum arthropoda.

79. Metameric segmentation is the characteristic of
(a) Platyhelminthes and Arthropoda.
(b) Echinodermata and Annelida.
(c) Annelida and Arthropoda.
(d) Mollusca and Chordata.

AIPMT-2006

Ans. (c) : The term metamerism refers to a linear repetition of parts in an animal body.
- It occurs in three highly organized phylum Annelid, Arthropoda and Chordata. Each segment is called a metamere, or somite. Segmentation often affects both external and internal structures. Such a condition is called metameric Segmentation.

80. Schizocoelomates and enterocoelomates are:
(a) Acoelomates (b) Invertebrates
(c) True coelomates (d) Echinoderms only

AIIMS-2015 / JIPMER-2011 / JCECE-2007

Ans. (c) : Presence or absence of body cavity between the body wall and the gut wall is very important in classification. The body cavity which lined by mesoderm called coelome. Animals possessing coelome are called coelomates, e.g., annelids, mollusks, arthropods echinoderms, hemichordates and chordates.
Schizocoelomates are invertebrate animal that possesses a schizocoel, a coelom, which is formed by the splitting of the mesodermal cell.
Enterocoelomates are animals in which coelom is lined by mesoderm which arise in the embryonic stage as an outpocketing of the developing gut. Hence, Schizocoelomates and Enterocoelomates are true coelomates.

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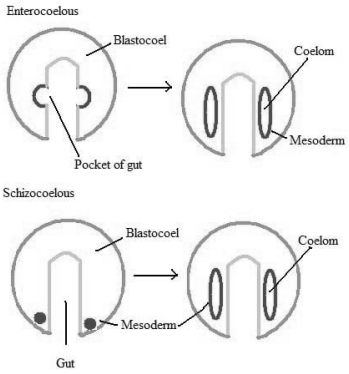
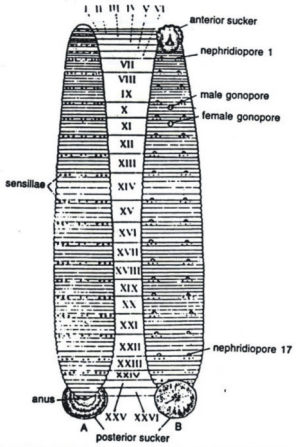
Flatworm are acoelomate animal.



81. Which one assists in locomotion?
(a) Trichocysts in Paramecium
(b) Pedicellariae of starfish
(c) Clitellum in Pheretima
(d) Posterior sucker in Hirudinaria

AIPMT-1993

Ans. (d) : Hirudinaria has a sucker. The anterior sucker is smallest and is perforated by the mouth, posterior sucker is bigger. It is essential for locomotion.



Leech (Hirudinaria). A. Dorsal, View, B. Ventral View

82. Radial symmetry is, usually, exhibited in animals which
(a) are attached to the substratum
(b) have one opening of alimentary canal
(c) live in water
(d) have ciliary mode of feeding.

AIPMT-1995, 1994
AIIMS-1996

Ans. (a) : The organisms are attached to the substratum possess radial symmetry in all vertical planes. When any plane passing through the central of axis of the body divides the organism into two identical haves, it is called radial symmetry.

83. Vivipary is found in :
(a) Coelenterata (b) Protozoa
(c) Rabbit (d) Pisces

Punjab MET-2006

Ans. (c) : Vivipary means giving birth to young ones .Viviparous animals produce young ones instead of laying eggs through sexual mode of reproduction.
Vivipary is found in Rabbit, Dolphin, Whales, Humans, Lion, Elephants, Dogs.Viviparity is development of the embryo inside the body of the mother.

84. Pseudocoel is present in :
(a) Periplaneta (b) Ascaris
(c) Pheretima (d) Hydra

Punjab MET-2006

Ans. (b) : Ascaris is a member of phylum Aschelminthes, which shows the presence of pseudo-coelom. Which derived from embryonic blastocoel.
It is covered externally by muscles but internally by the lining of the intestine (endoderm).

85. Radial symmetry is found in :
(a) frog (b) starfish
(c) humans (d) Pheretima

Punjab MET-2006

Ans. (b) : Radial symmetry is the regular arrangement of body parts around a central axis.
Adult echinodermata (starfish) are Radially symmetrical but larva of echinodermata are bilaterally symmetrical.

86. Match the locomotory organs given under column I with the phylum in which they are seen, listed under column II; choose the answer which gives the correct combination of the alphabets of the two columns:

Column–I (Locomotory organs)	Column –II (Phylum)
A. Pseudopdia	p. Mollusca
B. Parapodia	q. Chondriehthyes (Pisces)
C. Muscular foot	r. Protozoa
D. Fins	s. Annelida

(a) A = r, B = p, C = s, D = q
(b) A = p, B = r, C = s, D = q
(c) A = s, B = r, C = q, D = p
(d) A = r, B = s, C = p, D = q

Karnataka CET-2001

Ans. (d) :

Column-I		Column-II
Locomotany organs		Phyllum
A	Pseudopodia	Protozoa e.g. – Amoeba
B	Parapodia	Annelida. e.g. - Earthworm
C	Muscular foot	Mollusca e.g. – Pila
D	Fins	Chondrichthyes (Pisces) e.g. - Sark

87. Which of the following is not found in vertebrates?
(a) Bilateral symmetry (b) Gill opening
(c) Body scales (d) Cnidoblasts

CG PMT-2005

Ans. (d) : Cnidoblasts are not found in vertebrates cnidoblasts are specialized and modified interstitial cells which are found in coelenterate animals. The presence of cnidocytes (cnidoblast) the phylum coelentreata also know as cnideria. Cnidocytes help not only in defense but also in locomotion, adhesion and capture of prey.

88. Match the following list of animals with their level of organization and choose the correct sequence:

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Column–I	Column–II
(A) Organ level	(P) Pheritima
(B) Cellular aggregate level	(Q) Fasciola
(C) Tissue level	(R) Spongilla
(D) Organ system level	(S) Obelia

	(A)	(B)	(C)	(D)
(a)	(S)	(R)	(P)	(Q)
(b)	(S)	(Q)	(R)	(P)
(c)	(Q)	(S)	(R)	(P)
(d)	(Q)	(R)	(S)	(P)

Karnataka CET-2013

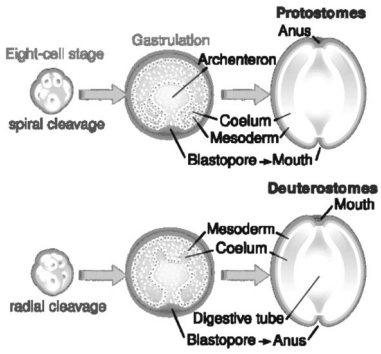
Ans. (d) :

	Column-I	Column-II
A	Organ level	Fasciola
B	Cellular aggregate level	Spongilla
C	Tissue level	Obelia
D	Organ system level	Pheritima

89. Which of the following are the characteristics of deuterosome?
(a) Spiral cleavage, blastopore becoming anus
(b) Spiral cleavage, blastopore becoming mouth
(c) Radial cleavage, blastopore becoming anus
(d) Radial cleavage, blastopore becoming mouth

DUMET-2002

Ans. (c) : The main characteristics of Deuterostomes include:-



- The anus is formed before the mouth

Radial, cleavage and the blastopore becoming anus.

- Mesoderm is formed from pockets of the gut

The main characteristics of Protostomes-

- A mouth that develops before the anus in embryos
- True tissue and are bilaterally symmetric
- Spiral determinate cleavage.

90. The general body plan and body symmetry are similar in
(a) frog and locusts
(b) sea horse and star fish
(c) annelids and sponge
(d) Pigeon and liver fluke

Punjab MET-2011

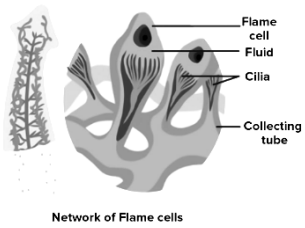
Ans. (a) : The general body plan and body symmetry are similar in frog and locust.

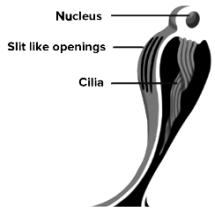
- Both frog and locusts are coelomates having bilateral body symmetry while the others have either different body plans or different body symmetry.
- Starfish is a radially symmetrical animal and seahorse is bilaterally symmetrical.
- Sponges are not true coelomates. They show cellular level of body organization. Body surface is also with skeleton in the form of spicules and spongin fibers.
- Annelida are coelomates. They show organ system level of body organization and bilateral symmetry.
- Pigeon is true coelomates and liver fluk is pseudocoelomate.

91. Solenocytes and nephridia are respectively found in :
(a) Platyhelminth and Annelids
(b) Annelids and Nematoda
(c) Cnidaria and Mollusca
(d) Mollusca and Echinodermata

JCECE-2003
Rajasthan PMT-2002

Ans. (a) : Solenocytes or flame cell are the excretory structrue in platyhelminthes. Solenocytes are a type of long, narrow flagellated cells that functions in excretion of nitrogenous wastes.





Solenocytes are primarily concerned with ionic and fluid volume regulation. Nephridia are the tubular excretory structure of earthworm and other annelids. Closed circulatory system is present in annelids, and they shows organ system level of body organization.

92. The body of the animal can be divided into identical halves in only one plane is
(a) asymmetry (b) bilateral symmetry
(c) radial symmetry (d) biradial symmetry

J&K CET-2010

Ans. (b) : Animals can be categorized on the basis of their symmetry. Sponges are mostly **asymmetrical** i.e. any plane that passes through the center does not divide them into equal halves.

When any plane passing through the central axis of the body divides the organism into two equal halves, it is called **radial symmetry** e.g., coelenterates, ctenophores and echinoderms.

Bilateral symmetry : The body is divided into two equal halves by only one plane.

e.g : Annelids

93. Which one of the following is a matching set of a phylum and its three examples ?
(a) Cnidaria-Bonellia, Physalia, Aurelia
(b) Platyhelminthes-Planaria/Schistosoma, Enterobuis
(c) Mollusca-Loligo, Teredo, Octopus
(d) Porifera-Spongilla, Euplectella, Pennatula

JCECE-2013

Ans. (c) : The matching set of a phylum–

1. Mollusca – Body is covered by Calcareous shell. Ex.- Loligo, Teredo, Octopus
2. Annelida – Body is divided into segments that are separated by septa. Ex.- Bonellia
3. Cridaria or coelenterate–They are also known as cnidarians due to presence of cnidoblasts. Ex.- Physalia, Aurelia, Pennatula

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4. Platyhelminthes–They are mostly parasitic with a few free-living. Ex.- Planaria, Schistosoma
5. Nematoda–Their body has a cavity or pseudocoelom. Ex.- Enterobuis
6. Porifera–They have spongy appearance and attached to the substratum and do not move. Ex.- Spongilla, Euplectella

94. Changes that allow the conversion of larva into adult, is called
(a) metagenesis (b) alternation
(c) metamorphosis (d) metastasis
CG PMT-2008

Ans. (c) : Metamorphosis is the transformation of larva into an adult through drastic changes.
Hormones called molting and juvenile hormones, which are not species specific, apparently regulate the changes.
Ex. Butterflies, moths, ants, beetles and bees.

95. Which of the following is the correct pairing of the classification group and common example ?
(a) Porifera - sea fan
(b) Crustacea - cattle fish
(c) Plathyhelminthes - Neries
(d) Mastigophora - Volvox
BVP-2006

Ans. (d) : The correct pairing of the classification group and common example is mastigophora volvox.
- Leeuwenhoek was the first scientist to observe volvox in 1700.
- Volvox is also known as globe algae.

96. Microlecithal eggs are present in
(a) Insects (b) Aves
(c) Fishes (d) Mammals
MGIMS Wardha-2012

Ans. (d) : Microlecithal egg is the one in which the amount of yolk is very less. The eggs of amphioxus, Marsupians and Eutharian mammals are of its type
- In insects centrolecithal eggs are found
- In Aves have Macrolecithal eggs.
- Dipnoi fishes have mesolecithal eggs and sharks, bony fishes have Macrolecithal eggs.

97. Animals which have well-marked digestive cavity are put under
(a) Metazoa (b) Bryozoa
(c) Parazoa (d) Enterozoa
CMC Vellore-2011
BVP-2011

Ans. (d) : Enterozoans are organisms which have distinct functional digestive tract.
- Enterozoa includes animals such as tape worm that is parasitic in the intestine.
- Bryozoa are aquatic invertebrate.
- Parazoa the sub – kingdom in which multi – cellular organism have less specialized cell than in the metazoan.
- Metazoans are eukaryotic multicellular organism.

98. The most recently discovered animal phylum is
(a) Concentricycloidea (b) Pogonophora
(c) Loricifera (d) Ctenophora
J&K CET-2011

Ans. (c) : The most recently discovered animal phylum is Loricifera.
- It was first discovered in 1983 by R.M. Kristensen.
- The loricifera is a microscopic, sediment dwelling marine invertebrate.
  Loriciferans have a hard, corset shaped shell called a Lorica, inside which is a head with an introvert surrounded by rings of elongated spines called scalids.
- Loricifera typically inhabit the space between sand and mud particles in the ocean. They are found in shallow waters. Many of them are acoelomate with some adults are pseudocoelomate.

99. The aquatic organism that can actively swim at will against the water current is
(a) Neuston (b) Plankton
(c) Nekton (d) Benthos
J&K CET-2011

Ans. (c) : Nekton are aquatic organism that are able to swim and move independently of currents.
- Plankton, Nekton and benthos are the three major classes of aquatic organism. These organism vary in the way they move and the place they live

(A) Benthos : Benthos are aquatic organism that crawl in sediments at water floor. They are decomposers eg : sponge, clams & Angle fish
(B) Phytoplankton : These are incapable of moving on their own. They are unable to swim against currents. Algae and bacteria that use sunlight to make food are known phytoplankton.
(C) Zooplankton : They are incapable to moving on their own. It is microscopic organism that eat phytoplankton
(D) Nekton : It travel by swimming in the sea on their non plankton and Nekton are main source of food. Fish and shrimp are example of nekton.

100. Match Column I with Column II and choose the correct answer.

	Column I		Column II
(i)	Incomplete digestive system	(A)	Sponges
(ii)	Cellular level of organization	(B)	Coelenterates
(iii)	Radial symmetry	(C)	Annelids
(iv)	Pseudocoelomate	(D)	Platyhelminthes
(v)	Metamerism	(E)	Aschelminthes

(a) i - C, ii - D, iii - A, iv - B, v - E
(b) i - D, ii - E, iii - B, iv - C, v - A
(c) i - D, ii - A, iii - B, iv - E, v - C
(d) i - A, ii - B, iii - C, iv - D, v - E
(e) i - B, ii - C, iii - D, iv - A, v - E
Kerala PMT-2014

Ans. (c) :

Column – I		Column – II	
I	Incomplete digestive system	D	Platyhelminthes
II	Cellular level of organization	A	Sponges
III	Radial symmetry	B	Coelenterates
IV	Pseudocoelomate	E	Aschelminthes
V	Metamerism	C	Annelids

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101. Study of behavior of animals called

(a) Ethology (b) Parapsychology
(c) Euphenics (d) Etiology

AMU-2009

Ans. (a) : Ethology - Ethology is the scientific study of animal behavior including animal communication predation, defence, aggression, imprinting fixed action pattern and releasers and migration most often in their natural condition.

Parapsychology - The study of special mental abilities which cannot be explained scientifically such as telepathy or knowing the future.

Euphenics - Euphenics is a symptomatic treatment of genetic disease of human beings.

- It deals with the control of several inherited human disease especially in born errors of metabolism in which the missing or defective enzyme has been identified.
- It can be done by various genetic techniques such as genetic engineering etc.

102. Match the various classes of animals given under Column-I with the examples listed in Column-II. Choose the answer which gives the correct combination of alphabets of the two columns.

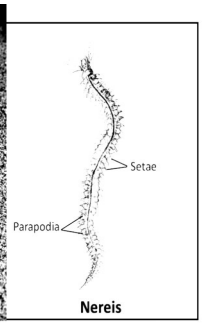
	Column - I (Classes)		Column - II (Examples)
A	Polychaeta	p.	scorpion
B	Trematoda	q.	pila
C	Arachnida	r.	liver fluke
D	Gastropoda	s.	nereis
		t.	star fish

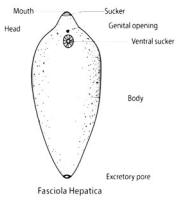
(a) A = s, B = r, C = p, D = q
(b) A = r, B = s, C = p, D = t
(c) A = q, B = s, C = t, D = p
(d) A = t, B = q, C = s, D = r

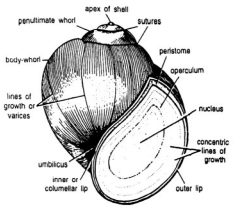
Karnataka CET-2003

Ans. (a) :

A. Polychaeta **s.** Nereis
B. Tremotoda **r.** Liver fluke
C. Arachnida **p.** Scorpion
D. Gastropoda **q.** Pila







Polychaeta - Polychaetes are mainly found in marines environment, from shallow waters down to the depths of deep-sea trenches.
Example :- Lugworm (Arenicola marina)
Sandworm or clamworm alitta
Nereis virens (the clamworm)

Trematoda - Trematoda are flatworm classified in the phylum platyhelminthes. Trematodes are dorso-ventrally flattened and leaf like in shape.
Example :- Schistosoma, Clonorchis, Fasciola (liver fluke).

Arachnida - Class arachnida of Arthropods comprising chiefly terrestrial invertebrates. Including the spiders, scorpion, mites, and ticks and having a segmented body divided in two region of which the anterior bears four pair of leg but no antenna.

Gastropoda - Gastropods can be recognised by their large foot, tentacles, coiled, shell (although this is sometime small or absent) and the presence of Torsion which is where the body is twisted round so that the anus reproductive organs, mantle cavity and gills all point forwards.
Example :- Pila

103. Match the branches of Biology listed in Column-I with the areas of study listed in Column-II. Choose the answer which gives the correct combination of alphabets of the columns.

	Column - I (Branches of biology)		Column - II (Area of study)
A	Helminthology	p.	study of insects
B	Entomology	q.	study of fungi
C	Ornithology	r.	study of algae
D	Phycology	s.	study of birds
		t.	study of worms

(a) A = p, B = s, C = q, D = t
(b) A = t, B = p, C = s, D = r
(c) A = s, B = t, C = r, D = p
(d) A = r, B = p, C = s, D = q

Karnataka CET-2003

Ans. (b) : Helminthology : Helminthology is the study of parasitic worm (helminthous). This field studies the taxonomy of helminthous and their effect on their hosts.
Helminth example : - Hookworm, Ascaris whipworm
Entomology : Entomology is the study of insect and their relationship to human, the environment and other organism.
Ornithology : The word ornithology comes from the late 16th century latin ornithologia meaning 'Bird science'.
Thus study of bird is known as ornithology.
Phycology : Phycology also called algology the study of algae is a large heterogeneous group of chiefly aquatic plant ranging in size from microscopic form of species all large as shrub or trees.

104. Animals like cockroach, lizards and mice share buildings to human dwelling such animals are

(a) transgenic (b) transplants
(c) inquilines (d) cultigens

AMU-2011

@apna_pdf

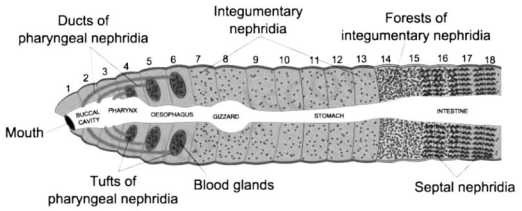
Ans. (c) : Inquilines : An animal that live commensally in the nest, burrow, or dwelling place of an animal of another species.
Example : Some organism such as insect may live in the homes of gophers or the garages of humans and feed on detritus, fungi, roots, etc.

105. Which one of the following pair of items correctly belongs to the category of organs mentioned against it?
(a) Thorns of Bougainvillea and tendrils of Cucurbita - Analogous organs
(b) Nictitating membrane and blind spot in human eye - Vestigial organs
(c) Nephridia of earthworm and Malpighian tubules of cockroach - Excretory organs
(d) Wings of honeybee and wings of crow - Homologous organs

Rajasthan PMT-2010

Ans. (c) : Nephridia : The nephridia are paired osmoregulatory – Excretory organ on the internal body wall of each segment of a worm.
• In earthworm, Nephridia are responsible for maintaining osmoregulation.
Malpighian tubules : The malpighian tubule (MTs) are the main excretory organ in most insects.
• They play a key role in the production of primary urine and osmoregulation selectively reabsorbing water, ions and solutes.

Excretory or Nephridial System of Earthworm



106. Which of the following is not a case of epimorphosis?
(a) Formation of sperms from small clumps of cells
(b) Regeneration of tall in a lizard
(c) Replacement of severed arm in starfish
(d) Replacement of limb is salamander

CMC Vellore-2013
Rajasthan PMT-2009
UP CPMT-2004

Ans. (a) : Epimorphosis : Epimorphosis is defined as the regeneration of a specific part of an organisms in a way that involve extensive cell proliferation of somatic stem cells differentiation and reformation as well as blastema formation, so formation of sperms from small clumps of cell is not a case of epimorphosis.

107. In which of the following class polymorphism is very distinct ?
(a) Class-Euccstoda (b) Class-Hydrozoa
(c) Class-Crinoidea (d) Class-Gastropoda

Rajasthan PMT-2000

Ans. (b) : The phenomenon of polymorphism is mainly seen in the class-hydrozoa.
Polymorphism : Polymorphism is the ability of an object to take an different forms.
Class-hydrozoa : The Hydrozoa is a class of Cnidarians they are characterized by having a life-cycle involving sexual and asexual reproduction.
Example : Fresh Water Jelly, Fresh water polyps (Hydra) obelia, Portuguese man of war (Physalia), Pink-hearted Hydroids (tubularia).

108. Root cap is absent in:
(a) Mesophyics (b) Hydrophytes
(c) Epiphytes (d) Xerophyies

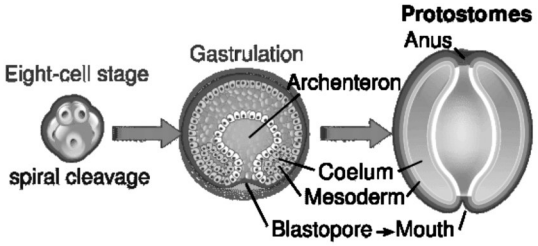
Rajasthan PMT-2006

Ans. (b) : Hydrophytes plants : Plants that live in water are known as hydrophytes.
Example : Hydrilla, Valisneria and other remaining completely submerged in the water.
• Root cap is absent in hydrophytes. In these type of plants root pocket is present instead of root cap. Root pocket act as balancing organs.

109. Spiral cleavage is found in
(a) nemertines (b) annelids
(c) mollusca (d) All of these

Haryana PMT-2011

Ans. (d) : Spiral cleavage : Spiral cleavage is a characteristic feature of protostome especially include spiralia here the resulting daughter cell are not located exactly on top of each other.



• Instead the blastomere are organized spirally around the embryo's pole to pole axis.
Phylum have spiral cleavage : Molluscs, Annelids Platyhelminth and Nemerteans.

110. Animals active at night are :
OR
An animal, which comes out at night and hides during the day is
(a) diurnal (b) nocturnal
(c) parasites (d) nocto-diurnal

BCECE-2004, 2009

Ans. (b) : Nocturnal animal : Animal active at night called nocturnal animal. Nocturnal animal tend to have elevated senses due to their activity in the dark.
• Good vision of nocturnal at night poor vision of prey species avoiding heat of the day.
Example :- Bat, Rat, Badger, Raccoon

111. Match the following column I with column II.

	Column-I		Column-II
A.	Vampire bat	1.	Osmotroph
B.	Cockroach	2.	Frugivorous
C.	Tiger	3.	Carnivorous
D.	Taenia	4.	Omnivorous
		5.	Sanguivorous

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(a) A - 2 B - 4 C - 3 D - 5
(b) A - 5 B - 3 C - 4 D - 1
(c) A - 1 B - 4 C - 2 D - 5
(d) A - 5 B - 4 C - 3 D - 1

CMC Ludhiana-2015

Ans. (d) :

Column-I		Column-II
Vampire bat	–	Sanguivorous
Cockroach	–	Omnivorous
Tiger	–	Carnivorous
Taenia	–	Osmotroph

112. Which one is not correctly matched?
(a) Mollusca - Pseudocoel
(b) Cnidaria - Nematocyst
(c) Annelida – Chloragogen cells
(d) Echinodermata – Water vascular system

Manipal-2010

Ans. (a) : Pseudocoel : Roundworm of phylum nematoda are characterized as pseudocoelomates.
- Phylum mollusca animals are bilaterally symmetrical, triploblastic and coelomate.
  Nematocyst : The nematocyst present in coelentrates are exclusive stinging apparatus of the cnidocytes/cnidoblasts and is a distinguishing feature of the phylum coelenterata.
- **Chloragogene cells :** Chloragogene cell also known as the yellow cells. Cell supposed to be excretory in nature which is analogous to human liver.

Water vascular system : The water vascular system or ambulacral system is a unique system of echinoderm that helps mainly in locomotion.
Example :- Star fish

113. Column I contains larval stages and column II contains the group to which it belongs. Match them correctly and choose the right answer.

	Colume I		Colume II
A	Planula	p	Annelida
B	Tornaria	q	Mollusca
C	Trochophore	r	Arthropoda
D	Bipinnarria	s	Chordata
E	Glochidium	t	Echinodermata
		u	Coelenterata

(a) A = u, B = s, C = p, D = t, E = q
(b) A = q, B = t, C = p, D = s, E = u
(c) A = t, B = s, C = r, D = q, E = p
(d) A = s, B = r, C = q, D = p, E = t

Karnataka CET-2011

Ans. (a) :

Group		Larval stage
Coelentrata	–	Planula
Chordata	–	Tornaria
Annelida	–	Trochophore
Echinodermata	–	Bipinnarria
Mollusca	–	Glochidium

114. Animals which possess cleidoic eggs exhibit.
(a) External fertilization and internal development
(b) Internal fertilization and internal development
(c) Internal fertilization and external development
(d) External fertilization and external development

Karnataka CET-2011

Ans. (c) : Cleidoic : Cleidoic egg is often referred to as an amniotic egg because it is characteristic of amniotes which have a thick and hard outermost shell. This hard shell is permeable for gases. Cleidoic eggs exhibit internal fertilization and external development.
Cleidoic egg is terrestrial adaptation. e.g. Birds and reptiles, prototheria mammal and insects.
- Cleidoic eggs have a protective shell and are laid out of water. The shell is porous to air and may be flexible or calcareous (hard). The egg contain all the food that embryo need to develop into a hatching.

115. Match List-I with List-II

List-I	List-II
A. Stomochord	**i. Hirudinaria**
B. Botryoidal tissue	**ii. Dentalium**
C. Captacula	**iii. Balanoglossus**
D. Rhabdites	**iv. Dugesia**
	v. Pinctada

The correct answer is:

	A	B	C	D
(a)	iii	ii	v	i
(b)	i	ii	iv	iii
(c)	iii	i	ii	iv
(d)	i	iii	ii	v

AP EAMCET-2016

Ans. (c) :

Stomochord	–	Balanoglossus
Botryoidal tissue	–	Hirudinaria
Captacula	–	Dentalium
Rhabdites	–	Dugesia

- Hemichordates have a rudimentary structure in the collar region called stomochord. e.g. Balanoglossus. Botryoidal tissues found in Hirudinaria.
- Captacula is present in the organisms in which there is no developed head. This is used as sensory organs. They are also helpful in digging and obtaining the food. This is present in the dentalium.
- Rhabdites are rod shaped that found in Dugesia or planaria.

116. Mark the right combination.
(a) Sycon system - Water vascular system
(b) Sea-urchin - canal system
(c) Hook worm - Pseudocoel
(d) Cray fish - Skeletal system
(e) None of the above

CMC Vellore-2015

Ans. (c) : Round worm or Ascaris lumbricoid are example of pseudocoelom.
Pseudocoelom is a body cavity filled with the separating of the gut of organism from the body wall, but without the line of mesoderm.

117. Read the following statements and choose the sets of correct ones.
(I) Neopillina galatheae is the most primitive mollusc having metamerism like annelids.
(II) Peripatus resembles and arthropod in having haemocoel dorsal heart with ostia, tracheal respiration and the pattern of development.

@apna_pdf

(III) Latimeria chalumnae is a surviving member of crossopterygii the probable anscetor of the first amphibians.
(IV) The theory of natural selection was proposed by Darwin and Wallace.
(a) I and II (b) III and IV
(c) I, II and III (d) All of the above
(e) None of the above

CMC Vellore-2015

Ans. (d) : Neopilina is a very primitive mollusc and connecting link between annelids and molluscs.
- **Peripatus** is a connecting link between arthropods and annelids.
- **Latimeria** is a genus of living coelacanth fishes that is the type of family Latimeriidae. It is sometime considered to be a living fossil, not a reptile but a fish.
- **Darwin and Wallace** The theory of evolution is a shortened form of the term 'Theory of evolution by natural selection', which was proposed by 'Darwin' and 'Alfred Russel Wallace' in 19th century.

118. Which of these statements are wrong ?
(i). Parapodia are lateral appendages in arthropods used for swimming
(ii). Radula in molluscs are structures involved in excretion
(iii). Aschelminthes are dioecious
(iv). Echinoderm adults show radial symmetry
(v). Ctenophorans are diploblastic
(a) i and ii (b) i and iii
(c) i, iv and v (d) iii and v
(e) ii, iii and iv

Kerala PMT-2011

Ans. (a) : Parapodia are lateral appendages in annelids, not arthropods. They are used for swimming respiration, and gas exchange.
• Radula is a rasping tounge like organ in molluses. It is used for scraping food from surfaces. If is not involved in exeretion.

119. Read the following statements and choose the correct option.
I. The pelvic fins of female sharks bear claspers.
II. In Obelia, polyps produce medusae sexually and medusae form the polyps a sexually.
III. Flame cells in Platyhelminthes help in osmoregulation and excretion.
IV. In non-chordates, central nervous system is ventral, solid and double.
V. Pinnae are present in mammals
(a) II, IV and V only are correct
(b) I, III and V only are correct
(c) III, IV and V only are correct
(d) I, II and III only are correct
(e) II and III only are correct

Kerala PMT-2013

Ans. (c) :
1. Male shark have a pair of external reproductive organ called clasper that are located between their pelvic fins. Claspers are use for reproduction.
• Female shark have a cloaca instead of claspers.
• Polyps produce medusas asexually and medusas produce polyp sexually.

120. Match the animals list with names under Column I with the amimals listed with regular zoological name given Column II; choose the answer which given the correct combination of the alphabets of the two columns:

	Column-I (Animals with common name)		Column-II (Animals with zoological name)
A	Starfish	p	Sepia
B	Jellyfish	q	Asteroidea
C	Devilfish	r	Aurelia
D	Cuttlefish	s	Octopus

(a) A = q, B = p, C = s, D = r
(b) A = q, B = r, C = s, D = p
(c) A = t, B = p, C = s, D = q
(d) A = t, B = s, C = p, D = r

Karnataka CET-2000

Ans. (b) :
Star-fish – Asteroidea
Jelly-fish – Aurelia
Devil-fish – Octopus
Cuttle-fish – Sepia

121. Match the names of branches of science listed under Column I with the field of study given under Column II ; choose the choice which gives the correct combination of the alphabets:

Column-I (Branch of science)		Column-II (Field of study)	
A	Mycology	p	Study of birds
B	Ornithology	q	Study of worms
C	Herpetology	r	Study of fishes
D	Ichthyology	s	Study of fungi
		t	Study of snakes

(a) A = s, B = t, C = p, D = r
(b) A = s, B = p, C = t, D = r
(c) A = p, B = s, C = r, D = t
(d) A = q, B = s, C = r, D = t

Karnataka CET-2000

Ans. (b) :
Mycology – Study of fungi
Ornithology – Study of birds
Herpetology – Study of snakes
Ichthyology – Study of fishes

122. Study the following lists

	List-I		List-II
(A)	Tuberculosis	(I)	Polyhedral
(B)	Pneumonia	(II)	Filamentous Branched
(C)	Cholera	(III)	Round cells
(D)	Polio	(IV)	Comma shaped
		(V)	Helical form

The correct match is
(A) (B) (C) (D)
(a) (II) (IV) (III) (I)
(b) (II) (III) (IV) (I)
(c) (V) (IV) (III) (II)
(d) (I) (II) (V) (IV)

TS EAMCET-15.05.2016

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Ans. (b) :
Tuberculosis – Filamentous branched
Pneumonia – Round cells
Cholera – Comma shaped
Polio – Polyhedral

123. Match the following with reference to larval forms

	List-I		List-II
(A)	Cydippid	(I)	Schistosoma
(B)	Muller's larva	(II)	Balanoglossus
(C)	Trilobite larva	(III)	Hormiphora
(D)	Miracidium larva	(IV)	Dugesia
		(V)	Limulus

(A) (B) (C) (D)
(a) (III) (IV) (V) (I)
(b) (III) (IV) (II) (V)
(c) (II) (I) (V) (III)
(d) (II) (III) (I) (IV)

TS EAMCET-15.05.2016

Ans. (a) :
Cydippid – Hormiphora
Muller's larva – Dugesia
Trilobite larva – Limulus
Miracidium larva – Schistosoma

Cydippid larva is found in some marine forms of hormiphora which does not reproduce asexually.

- In dugesia, muller's larva is formed. Muller's larva or mulleria is a larval form of some polycladida. It has 8-fold symmetry and is somewhat like a Ctenophore muller's larva is ciliated and has several pairs and unpaired lobes.
- Trilobites larva is found in limulus. It is a Juvenile of larva found in living fossil animals like limulus.
- Miracidium larva is found in schistosoma. The miracidium along with the cercaria both of which are water borne and free living are the only two stages in the life cycle of schistosoma.

124. Match the following:

List-I	List-II
A. Ductus botalli	1. Oikopleura
B. Ductus carotians	2. Lepidosiren
C. Neotany	3. Lamprey
D. Anadromous	4. Lacertillia
E. Amazon	5. Uraeotyphlus

	A	B	C	D	E
(a)	5	4	1	3	2
(b)	5	1	4	3	2
(c)	5	1	4	2	3
(d)	4	1	5	2	3

AP EAMCET-2006

Ans. (a) : A. Ductus botalli - Uraeotyphlus
B. Ductus carotians - Lacertillia
C. Neotany - Oikopleura
D. Anadromous - Lamprey
E. Amazon - Lepidosiren

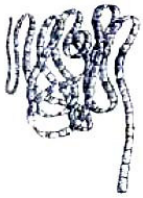
125. Which of the following animals have scattered cells with cell – tissue grade organisation:
(a) Sponge (b) Hydra
(c) Liver fluke (d) Ascaris

AIPMT-2000

Ans. (b) : Hydra belongs to the most primitive class of hydrozoa in the phylum Coelenterata. It has a simple form and structure. In Hydra tissue grade level of body organization found. They are solitary, sessile, freshwater animals that are cosmopolitan in distribution.

- Sponge, has cellular grade level of organization.
- Liver fluke, has organ grade level of organization.
- Ascaris, has organ system grade level of organization.

126. The figure shows four animals (a), (b), (c) and (d). Select the correct answer with respect to a common characetrsitcs of two of these animals

(a) 
(b)
(c)
(d)

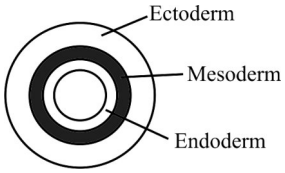
(a) (c) and (d) have a true coelom
(b) (a) and (d) respire mainly through body wal
(c) (b) and (c) show radial symmetry
(d) (a) and (b) have cnidoblasts for self defence

AIPMT (Mains)-2011

Ans. (a) : True coelom, which refers to a body cavity that is completely lined by mesoderm is found in the mollusca, annelids, arthropods, echinoderms & chordates.

- In all advance invertebrate phyla have a true coelom.
- The formation of coelom splitting of mesoderm.
- This kind of coelom called **shizocoelomates**.

Octopus- Belong from phylum mollusca and order Octopoda.



Scorpion- It is predatory organism (Arthropod) class Arachnid.

- The coelom forms by out pocketing of the primitive gut.
- It is thus called **enterocoelomates**.

127. The plane that divides the body into right and left halves.
(a) Transverse (b) Frontal
(c) Sagittal (d) Radial

AP EAMCET-2010

Ans. (c) : Sagittal – Sagittal is a section through an organism that is bisected in the longitudinal plane and divides the body into right and left halves.
Transverse section also called cross sectional is a cut or slice taken perpendicular to the long axis of a structures or organism.

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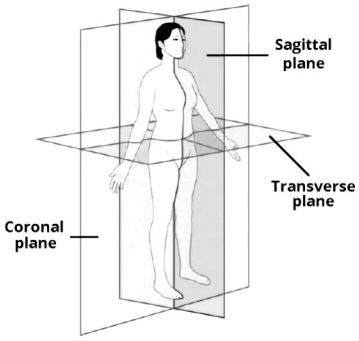

Frontal section – Frontal section is a section through the body passing at right angles to the median plane dividing the body into dorsal and ventral part.
Radial section – Radial section is the vertical plane from the pith at the center of the tree heading out towards the bark.

128. Which one of the following groups of three animals each is correctly matched with their one characteristic morphological feature?

	Animals		Morphological feature
(a)	Scorpion, Spider, Cockroach	–	Ventral solid central nervous system
(b)	Cockroach, Locust, Taenia	–	Metameric Segmentation
(c)	Liver fluke, Sea anemone, Sea cucumber	–	Bilateral symmetry
(d)	Centipede, Prawn, Sea urchin	–	Jointed appendages

AIPMT-2008

Ans. (a) : Scorpion, spider and cockroaches belong to the phylum Arthropoda and have a ventral solid nerve cord. They have jointed appendages.
Non chordate have Double ventral solid, Nerve cord
Chordate have Single, dorsal hollow, Nerve cord
- Metameric segmentation in this condition, inter segmental septa are present, which provides internal as well as external segmentation, also called true segmentation. Ex- Earthworm, Cockroach, Locust.
- Bilateral symmetry body is divide into identical left and right halves in only one plane. Example– Liver fluke is a flatworm. Sea Anemone and sea cucumber are Echinoderms, so they have radially sysmmetry.
- Jointed appendages:- Phylum Arthropoda have jointed appendages. Example- Centipede, Prawn etc.

129. In coelomates the problem of diffusion of food from gut to tissues is solved by
(a) The presence of coelomic fluid
(b) Churning the food within the cavity
(c) Developing a circulatory system
(d) Developing gut associated glands

AP EAMCET-2009

Ans. (c) : In Coelomate, the developing circulatory system is the solution of the problem of diffusion to food from gut to tissue. After digestion and absorption, most of the absorbed food materials are passed into paracellular space (in between the enterocytes), from where they enter blood capillaries and then transported to tissue.
- Coelomic fluid present in coelom and act as protective cushion for internal organ.
- Churning of food helps in digestion of food.
- Gut associated glands like liver, pancrease etc help in the digestion.

130. As per classification which of the following is correct?
(a) Ascaris, Pheretima, Grasshopper
(b) Hydra, Pterido, Leucosolenia
(c) Starfish, Grasshopper, Solen
(d) Pila, Dentalium, Octopus

MGIMS Wardha-2003

Ans. (d) : Pila (Apple snail), Dentalium (Tusk shell)and Octopus (Devil fish) are Molluscus. All organisms belonging to the same phylum-Mollusca.
- Ascaris belongs to phylum Aschelminthes, Pheretima is an annelid while the Grasshopper belongs to phylum Arthropod.
- Hydra belongs to phylum – Cnidaria, Pteridophyte is a plant phylum while Leucosolenia belongs to phylum porifiera.
- Starfish beongs to phylum Echinodermata, grasshopper is an arthropod while salmon is belongs to phylum chordate.

131. Cleidoic eggs are found in :
(a) fishes (b) amphibians
(c) few reptiles (d) None of these

AFMC-2011

Ans. (c) : Cleidoic eggs are defined as having a thick, rigid outer shell, made of calcium carbonate.
The elements like yolk, water and salt are present in the egg shell and these are known as cleidoic eggs. Ex: Few reptiles.
• Non - cleidoic eggs are found in fishes.

132. In sharks, one of the following is absent
(a) Claspers
(b) Placoid scales
(c) Cartilaginous endoskeleton
(d) Air bladder

J&K CET-2008

Ans. (d) : Air bladder is distinctive characteristic of bony fishes while sharks belong to cartilagenous fishes that do not contain air bladders and hence have to swim continuously or else they may sink.
• Male sharks have claspers that help in mating during sexual reproduction.

133. An acoelomate animal with bilateral symmetry is
(a) Hydra (b) Liver fluke
(c) Physalia (d) Obelia

DUMET-2008

Ans. (b) : An acoelomate animal with bilateral symmetry is Liver fluke it belong to phylum Platyhelminthes. This symmetry is also known as plane symmetry. In this symmetry body is divided into two equal haves in one plane.

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134. What is the similarity between fly, mosquitoes and cockroach?
(a) All have 13 chamber heart
(b) All have 4 pairs of legs
(c) All have open excretory system
(d) All belong to class Insecta

AFMC-2002

Ans. (d) : The fly, mosquitoes and cockroach all are belongs to class insect and phylum Arthropoda.
osquitoes- order-Diptera
Cockroach- order- Blattadea

135. Heart lacks sinus venosus in:
(a) fishes (b) mammals
(c) amphibians (d) echinoderms

AFMC-2002

Ans. (b) : The sinus venosus, or systemic venous sinus, is the cardiac chamber with myocardial walls located upstream of the right atrium in tetrapods and the single atrium of fish.
• Certain adult birds and mammals lack the presence of sinus venosus, precaval and postcaval veins in their heart. Thus the hearts of mammals lack sinus venosus.

136. The movement seen in the trichoid joint is:
(a) decrease in angle
(b) restricted in different planes
(c) free in more than one plane
(d) rotator around a central axis

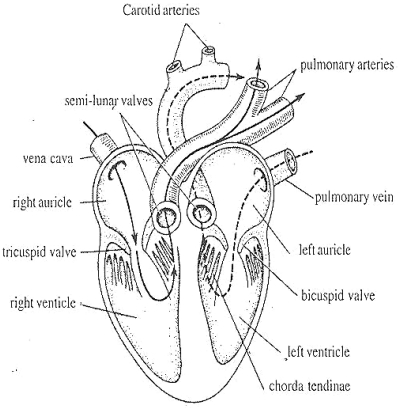
AP EAMCET-2004

Ans. (d) : Pivot joint are also called rotatory joint or trochoid joint, in vertebrate anatomy. It is a freely moveable Joint (diarthrosis) that allows only rotatory movement around a single axis.
• The moving bone rotates within a ring that is formed from a second bone and adjoining ligament.
• Pivot joints also provide for the twisting movement of the bones of the forearm (radius and ulna) against the upper arm.

137. Myogeneic heart is characteristic feature of
(a) chordates
(b) chordates including fishes
(c) non-chordates like annelids and arthropods, and vertebrates
(d) mollusca and other vertebrates like man

VMMC-2014

Ans. (d) : A heart that does not require neural input to beat is called a myogenic heart. Myogenic heart is found in molluscs and vertebrates.



138. The group amniota includes
(a) birds and reptiles
(b) birds and mammals
(c) reptiles and mammals
(d) reptiles, birds and mammals

Manipal-2013

Ans. (d) : Amniota is a group of vertebrates, it included all living reptiles, birds, mammals and their extinct relatives and ancestors.
• The amniotes are the evolutionary branch (clade) of the tetrapods in which the embryo develop within a set of protective extra - embryonic membranes -the Amnion, chorion and allantois.

139. Which one pair/set exhibit uricotelism?
(a) Bird, land reptiles and insect
(b) Fish, birds and amphibians
(c) Mammals, birds, and reptiles
(d) Amphibians, mammal and reptiles

Manipal-2013

Ans. (a) : Uricolelism is a metabolic process found in some animal including reptiles, birds, and insects, where uric acid is the primary west product excreted.
Uric acid is relatively in soluble compound which allows it to be excreted as a semi-solid allows it to be excreted as a semi-solid parts or power conserving water in these animals.

140. Coelom is lined on all sides by
(a) Ectoderm (b) Mesoderm
(c) Endoderm (d) Both (a) and (b)

J&K CET-2015

Ans. (b) : True coelom is the body covity which is completely lined with mesoderm and the animal are called coelomates. The coelom is a fluid -filled cavity located between the outer wall of the body and the digestive tract.
• The outer layer is called the ectoderm, the middle layer mesoderm, and the inner layer endoderm.
• The mesoderm lying in between the outer 2 layer encloses the coelom.

141. All flatworms differ from all round worms in having
(a) triploblastic body
(b) solid mesoderm
(c) bilateral symmetry
(d) metamorphosis in the life history

DUMET-2009

Ans. (b) : Flatworms are acoelomate i.e. they have solid mesoderm. Flatworms, platyhelminthes are a phylum of relatively simple bilaterian, unsegmented, soft-bodied invertebrate. On the other hand, Roundworms are pseudocoelomate.

142. Coelom derived from blastocoel is known as :
(a) haemocoel (b) enterocoelom
(c) pseudocoelom (d) schizocoel

DUMET-2001

Ans. (c) : A pseudocoelomate is also known as a blastocoelomate.
Some animal, the body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called pseudocoelom and the animal possessing them are called pseudocoelomates.

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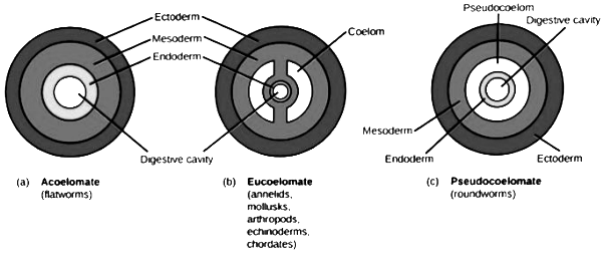
• A pseudocoelomate is often a small animal, which relies mostly on diffusion to distribute oxygen and nutrients to its cells.



143. Sinus venosus is present in :
(a) birds only
(b) birds and mammals
(c) reptiles and birds
(d) fishes, amphibians and reptiles

DUMET-2001

Ans. (d) : The first chamber to receive returned blood is the sinus venosus. The sinus venosus, which is found in fishes, amphibians and reptiles, allow for the mixing of pure and impure blood in the same chamber.
• The heart of aves and mammals is 4 chambered i.e. two auricles and two ventricles. The right auricle receives deoxygenated blood from the superior vena cava (precaval) and inferior vena cava (post caval), after that sends it into the right ventricle which pumps the deoxygenated blood to the lungs for oxygenation.

144. Which of the following animals has a true coelom?
(a) Ascaris (b) Pheretima
(c) Sycon (d) Taenia solium

J&K CET-2007

Ans. (b) : The body cavity lined by mesoderm is called coelom. Animal having coelom are called coelomates e.g. Annelids, Echinoderms and Chordates.
Pheretima belongs to phylum Annelida.
These are nocturnal in habit and live in damp, moist, humus rich soil of lawns, gardens etc. Body is long, narrow and cylindrical and colour in brown. Body is divided into 100-140 segments called metameres.
• Pheretima has true coelom (schizocoel). The coelom is filled with milky white alkaline coelomic fluid.

145. Which of the following organisms is pseudocoelomate?
(a) Hookworm (b) Liver fluke
(c) Jellyfish (d) Leech

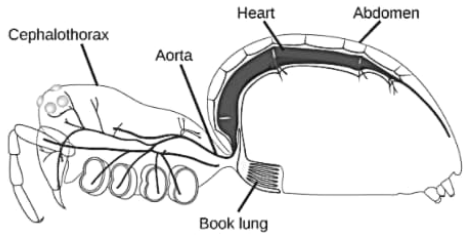
Rajasthan PMT-2011
DUMET -2002

Ans. (a) : Pseudocoelomate are the organisms that have false body cavities.
- They have a fluid - filled body cavity separating the gut of the organism from the body wall but it is not lined by mesoderm, unlike true coelemates.
- All the organisms belonging to Aschelminthes are pseudocoelomates.
- Hook worm is an example of pseudocoelomate.

146. Book lungs are the respiratory organs in:
(a) Protozoans (b) Cnidarians
(c) Arthropods (d) Amphibians

Rajasthan PMT-2006,2004

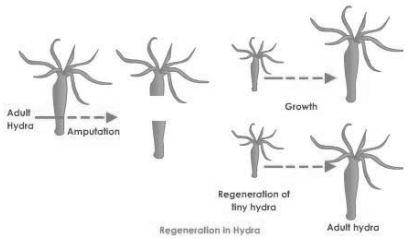
Ans. (c) : Book lungs are a type of respiratory organ in arachnids such as spiders, and scorpions.
- They are known as book lungs because of their stacked-plate appearance resembling closed pages of a book.
- 4 pairs of book lungs are found in scorpions and two pairs are found in spiders.
- The book lungs are located inside the animals of class arachnid Arthropoda.
- It is filled with haemolymph that carries oxygen.



147. Morphallaxis (morphallactic regeneration) occurs in
I. Hydra **II. Planaria**
III. Salamander **IV. Lizard**
(a) I and III (b) I and II
(c) II and IV (d) IV and I

CMC Ludhiana -2013

Ans. (b) : Regeneration is the natural process of replacing or restoring damaged or missing cells, tissues, organs, and even entire body parts of full function in plants and animals.



• In morphallaxis , every cut section of the organism regenerates into the whole organism. For example Planaria and Hydra can regenerate into whole organisms from a split section.

148. Torsion and detorsion are exceptional to
(a) Mollusca (b) Echinodermata
(c) Annelida (d) All of these

CMC Ludhiana-2011

Ans. (a) : Torsion and detorsion are exceptional to mollusca. Phylum mollusca divided into seven classes:- Aplacophora, Monoplacophora, Polyplacophora, Bivalvia, **Gastropoda**, Cephalopoda and Scaphopoda.
The gastropods have an asymmetrical body. Torsion is the rotation of the visceral mass, mantle and shell 180 degree with respect to the head and foot of the gastropod. This leads to the mantle cavity and anus to an anterior position above the head, thereby causing asymmetry in gastropod. Detorsion is brought about by the reversal of the torsion phases and it occurs in same groups of gastropods.

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B. Porifera

149. Which of the following cell type is capable of giving rise to other cell types in sponges?

(a) Thesocytes (b) Pinacocytes
(c) Cnidocytes (d) Archaeocytes

VMMC-2012 / JIMPER-2009
MGIMS Wardha-2008 / UP CPMT-2012, 2008
Rajasthan PMT-2008 / CG PMT-2008
Punjab MET-2004 / DUMET-2001
Manipal-2000 / AIIMS-1994

Ans. (d) : Archaeocytes cell type is capable of giving rise to other cell types in sponges.
Archaeocytes area totipotent and can change into all other types of sponge cell. It is present in the gemmule and its helps in asexual reproduction.

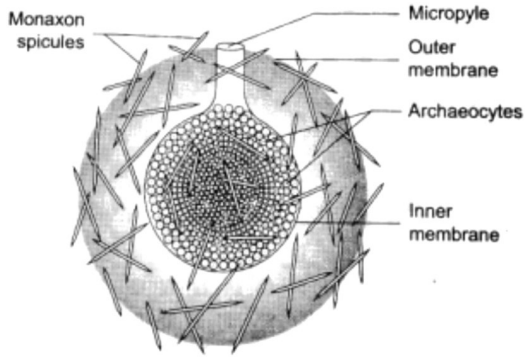
150. During unfavourable conditions, the sponges form

(a) cyst (b) encyst
(c) spicule (d) gemmule

AP EAMCET-2011
MGIMS Wardha-2010
JIPMER-2010 / BVP-2008
Uttarakhand PMT-2007

Ans. (d) : During unfavourable conditions, the sponges form gemmule and are involved in asexual reproduction.
Gemmules are internal buds, that are capable of developing into a new organism or adult sponge.

- Gemmule help to survive during unfavorable condition and germinate to produce new sponges.
- A fully formed gemmule is a small hard ball having a mass of food laden archaeocytes enclosed in a double layered tough envelope with amphidisc spicules.



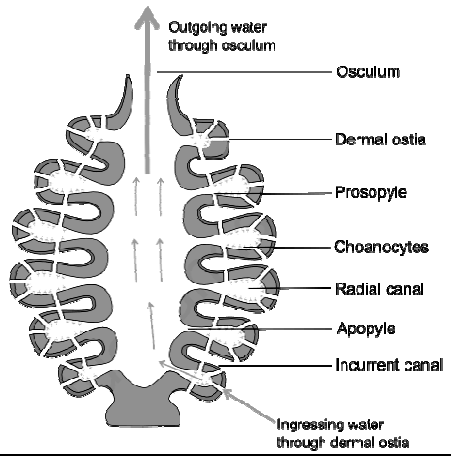
Gemmule in sponges

151. Canal system is present in phylum:

(a) Annelida (b) Porifera
(c) Acanthocephala (d) Echinodermata

HP CET-2018
Rajasthan PMT-2011, 2004
BCECE-2009, 2007

Ans. (b) : Canal system is the characteristic feature of the phylum porifera. They are primitive multicellular, non-motile aquatic organisms, commonly called as sponges. Body is perforated with many pores called ostia. Water enters into the body through ostia and leads to canal system. It circulates water throughout the body and carries food and oxygen.



152. The excretory material of bony fish is :

(a) urea (b) protein
(c) ammonia (d) amino acid

VMMC-2012 / Uttarakhand PMT-2008
CG PMT-2008 / MGIMS Wardha-2006
DUMET-2001

Ans. (c) : The excretory material of bony fish is ammonia. It is a excretory product which is very toxic substance to tissue and extremely soluble in water. The process of excretion of ammonia is known as Ammonotelic. It is observed in aquatic animals.

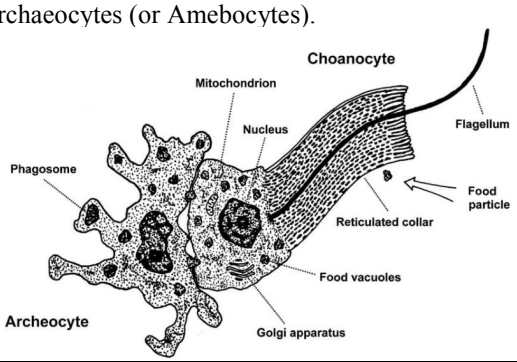
153. In case of poriferans the spongocoel is lined with flagellated cells called :

(a) Ostia (b) Oscula
(c) Choanocytes (d) Mesenchymal cells

NEET-2017 / AMU-2005
Manipal-2004 / Uttarakhand PMT-2004

Ans. (c) : In case of poriferans the spongocoel is lined with flagellated cells called choanocytes.
Choanoderm is the inner cellular layer, lining the Spongocoel in porifera consisting of flagellated cell, called Choanocytes.

- **Ostia** are small pores with connect the outer environment to spongocoel.
- **Oscula** is the large aperture in a sponge through which water is expelled.
- **Mesenchyme** also known as methyl in sponges, is a gelatinous matrix that contains skeletal elements and archaeocytes (or Amebocytes).



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154. Identify the correct statements in relation to Wucheraria

(a) Pineal spicules are unequal and chitinous.
(b) Pineal spicules are equal in size and chitinous.
(c) Sausage shaped larva is formed in labrum of mosquito
(d) Mamillated eggs are found in the life cycle.

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : • Wuchereria bancrofti is a filarial nematode that, as an adult, is a thread-like worm. The female nematodes are 10 cm long while the males are only about 4 cm long. It is digentic parasite requiring two hosts to complete its life cycle. Two hosts are man and female culex mosquito.

• A pair of uneuqal chitinous penial setae or copulatory spicules is present in cloacal or curued region. Many copulatory papillae are present in the posterior region.

155. Study the following table and pick up the incorrect combination (s).

S. No.	Group	Salient feature	Example
I)	Cyclostomata	Absence of renal portal system	Lamprey
II)	Gnathostomata	Internal ears with three semi circular canals each	Lanselet
III)	Chondrichthyes	Heterocercal caudal fin	Torpedo
IV)	Osteichthyes	Absence of air bladder	Catla

(a) I, II (b) II, IV
(c) II, III (d) I, IV

TS EAMCET-30.07.2022 Shift-II

Ans. (b) :

	Group	Salient Feature	Example
1.	Cyclostomata	Absence of renal portal system	Lamprey
2.	Gnathostomata	Internal ears with three semi circular canals each	Placodermii
3.	Chondrichthyes	Heterocercal caudal fin	Torpedo
4.	Osteichthyes	Presence of air-bladder	Catla

156. Match the following:

Classes	Examples
A) Demospongiae	I) Corallium
B) Anthozoa	II) Beroe
C) Hydrozoa	III) Euplectella
D) Nuda	IV) Obelia
	V) Chalina

The correct match is

	A	B	C	D
(a)	V	I	IV	III
(b)	II	IV	I	V
(c)	V	I	IV	II
(d)	III	V	IV	I

TS EAMCET-30.07.2022 Shift-II

Ans. (c) :

	Classes		Examples
(A)	Desmospongiae	(V)	Chalina
(B)	Anthozoa	(I)	Corallium
(C)	Hydrozoa	(IV)	Obelia
(D)	Nuda	(II)	Beroe

157. Sponges that contain calcareous spicules and live in shallow marine waters are included under the class

(a) Calcarea (b) Demospongia
(c) Hexactinellida (d) Scyphozoa

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : Calcareous sponges belongs to the class calcarea under phylum Porifera. The members of this class characterized by spicules made of calcium carbonate.
Sponge divided into 3 classes
(i) Calcarea- Calcareous skeleton
(ii) Hexactinellida- siliceous skeleton
(iii) Desmospongia-Silicious or spongin fiber

158. Which of the following is not a characteristic feature of sponges?

(a) Cellular level of organization
(b) Body supported by chitin
(c) Intracellular digestion
(d) Presence of ostia

AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Sponges are primitive multicellular animal they have only cellular level of body organization.
Body supported by chitin is not a characteristic feature of sponges because sponges body is supported by spicules that made of calcium or silica or proteinaceous spongin fibers.
Ostia are the inhalant pores in sponges through which water enters the body.
Nutrition in sponges is intracellular.
Development in sponges is indirect through larval stages known as parenchymula and Amphiblastula.
• Chitin is present in the cell wall of fungi.

159. A sponge harmful to oyster industry is_____

(a) Cliona (b) Euspongia
(c) Sponailla (d) Hyalonema

AP EAMCET-24.09.2020 Shift-I
MGIMS Wardha-2008

Ans. (a) : Cliona (boring sponges) is a genus of Demospongiae in the family clionaidae. It is found worldwide. These sponges mostly live on reefs and lagoons. They are harmful to the oyster industry because they create round holes on the shells of oysters.

160. The outer chitinous layer of the gemmule of a sponge is secreted by____

(a) choanocytes (b) interstitial cells
(c) amoebocytes (d) archaeocytes

MHT CET-08.10.2020 Shift-I

Ans. (c) : The outer chitinous layer of the gemmule of a sponge is secreted by amoebocytes.
• An amoebocyte is a cell with motility, it move and surround the central mass of archaeocytes and it secrete thick hard chitinuous inner layer and an outer membranous layer around archaeocytes that forms layer around it.

@apna_pdf

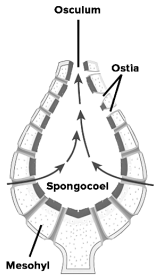
Amoebocytes have a variety of functions delivering nutrients from choancytes to other cells within the sponge, giving rise to eggs for sexual reproduction.

161. In most simple type of canal system of porifera, water flows through which one of the following ways?

(a) Ostia→ Spongocoel→ Osculum→Exterior
(b) Spongocoel→ Ostia→ Osculum→ Exterior
(c) Osculum→ Spongocoel→ Ostia→ Exterior
(d) Osculum→ Ostia → Spongocoel → Exterior

WB JEE-2012

Ans. (a) : In most simple type of canal system of Porifera, water flows through the following ways - Ostia→ Spongocoel→ Osculum→Exterior.
Water canal system is a characteristic feature of phylum porifera. The body of the poriferans have pores called ostia. The body has only one opening called the osculum. There is a continuous water movement from the exterior to the interior of the body of the poriferans. Water flows through the ostia into the spongocoel and goes out through the osculum. This helps in food gathering, exchange of gases and removed of waste.



Basic sponge body plan

162. Muscles in sponges are

(a) striated (b) smooth
(c) Both [a] and [b] (d) None of these

Uttarakhand PMT-2011

Ans. (d) : Sponges do not have muscular tissue; myocytes form fusiform contractile cells. They are able to contract without muscles.

- They are animals of the phylum porifera.
- They lack muscles, nerves and other internal organs.
- Tubular cells (porocytes) makeup the pores into the sponge body through the mesophyl.
- They have ascon, sycon and leucon type body.

163. The phenomenon of regeneration in sponges was observed and explained by :

(a) H.W. Wilson (b) Aristotle
(c) Robert Grant (d) Ellis

Uttarakhand PMT-2006

Ans. (a) : The phenomenon of regeneration in sponges was observed and explained by H.W. Wilson.

- Regeneration morphogenesis i.e. the ability to restore the lost parts by regeneration in sponges.
- Sclerocyte cells are responsible for forming the skeleton of porifera. Thus the power of regeneration in sponges is due to Archaeocytes or Amoebocytes.
- Aristotle gave the theory of spontaneous generation.
- Robert E. Grant was the one who coined the term porifera in 1836.
- John Ellis, recognize the animal nature of sponges.

164. Power of regeneration of sponges is due to:

(a) theocytes (b) archaeocytes
(c) amoebocytes (d) sclerocytes

AIIMS-2000

Ans. (b) : Power of regeneration of sponges is due to archaeocytes.

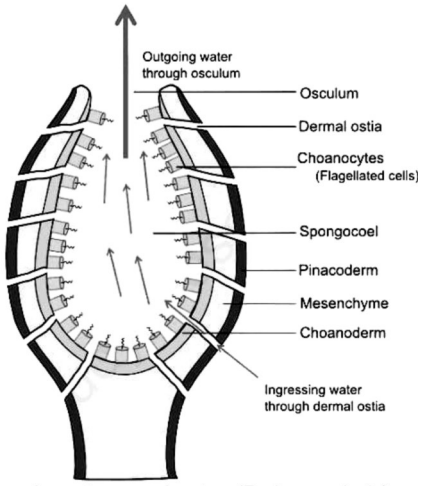
- Regeneration morphogenesis i.e. the ability to restore the lost parts by regeneration in sponges.
- Archaeocytes are type of amoebocytes cells found in sponges. They are totipotent cell which can transforms into sclerocytes, spongocytes or collencytes.

165. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum

(a) Protozoa (b) Coelenterata
(c) Porifera (d) Mollusca

AIPMT (Re-Exam)-2015

Ans. (c) : Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of the phylum Porifera.
Phylum porifera comprises sponges which are aquatic, marine, sessile, radically symmetrical or asymmetrical animals.
This phylum has characteristics of canal system.
Sponges have a central body cavity known as spongocoel which is lined by specialized flagellated cells called choanocytes or collar cells.



Ascon type canal system (Ex: Leucosolenia)

166. Collar cells are characteristic of

(a) earthworm (b) roundworms
(c) coelenterata (d) sponges

UP CPMT-2009

Ans. (d) : Collar cells are seen in the body wall of sponges. Collar cell/choanocytes are specialized cell consist of a flagellum, a collar and a nucleus. The collar of choanocytes contain various microvilli.
Collar cell are chacteristic feature of the sponges.

167. Which of the following have porous body and are diploblastic?

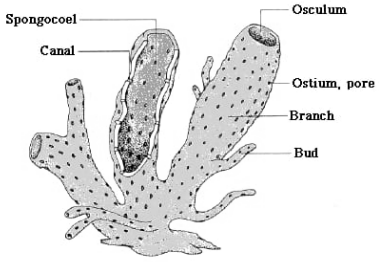
(a) Aurelia and Obelia
(b) Adamsia and Euplectella

@apna_pdf

(c) Leucosolenia and Spongilla
(d) Sycon and Hydra

AIIMS-2010

Ans. (c) : Leucosolenia and spongilla have porous body and are diploblastic. Both are belonging to phylum porifera means pore bearing. So they have pore throughout their body.



168. What is the range of length of sponges?
(a) 1 mm - 10 mm
(b) 1 cm - 1 metre
(c) 1 mm - 100 mm
(d) 1 metre - 10 metre

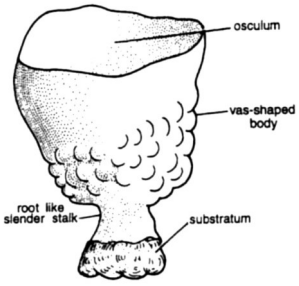
BCECE-2015

Ans. (b) : Some sponges are about a centimeter long and may be even less than a centimetre. Some sponges which are vase like or cylindrical are up to 1 or 2 metre long.
- Sponges have a high efficiency and capacity for particle retention preferably small particle (<10μm) such as bacteria, phytoplankton viruses and dissolved organic matter.
- The range of length of sponges is 1cm - 1 metre.

169. Proterion is an example of
(a) Protozoa (b) Porifera
(c) Cnidaria (d) Ctenophora

BCECE-2015

Ans. (b) : Proterion is an example of phylum porifera. Proterion which is now known as cliona patera, is commonly called as Neptune's cup.
It includes multicellular animals that are commonly called sponges.



170. Which of the following features is universally present in all sponges?
(a) marine habitat
(b) presence of spicules
(c) presence of spongin fibres
(d) presence of spongocoel

MP PMT-2013

Ans. (d) : All sponges have a central body cavity known as spongocoel which is lined by choanocytes or collar cells. Hence, the thing which is common for all sponges is spongocoel.
- Sponges may be marine (eg-sycon) or fresh water (eg – spongilla)

171. One animal that does not perform locomotion is
(a) Sycon (b) Nereis
(c) Sepia (d) Euglena

JIPMER-2011

Ans. (a) : Sycon is a sponges that belong to phylum porifera. Sponges are sessile as they are attached to a substratum. Hence, Sycon does not perform locomotion
- In Nereis locomotary organ is parapodia.
- In Sepia (cuttlefish) locomotary organ is fins.
- In Euglena locomotary organ is flagella.

172. The canal system is a characteristic feature of
(a) echinoderms (b) helminthes
(c) coelenterates (d) sponges

JIPMER-2011 / Punjab MET-2010
BCECE-2012

Ans. (d) : The canal system is a characteristic feature of sponges, belong to phylum porifera. It is also called an aquiferous system. The canal system of sponges acts as a water circulatory system. It helps in food acquisition, respiration and excretion. In porifera canal system is of three types e.g. Asconoid, syconoid and leuconoid.

173. Members of phylum Porifera are
(a) exclusively marine animals
(b) exclusively fresh water animals
(c) mostly fresh water animals but few are marine animals
(d) mostly marine animals but few are fresh water animals

HP CET-2012 / VMMC-2004

Ans. (d) : Sponges are the members of phylum porifera. They are generally marine and asymmetrical animals but few are freshwater animals. They show cellular level of body organization. Spicules or sponging fibres make up the skeleton of sponges. It provides them structural support.

174. Larva of Sycon is:
(a) parenchymula (b) amphiblastula
(c) redia (d) trochophore

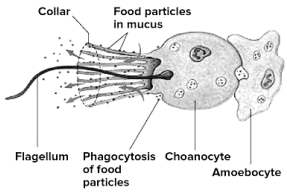
Rajasthan PMT-2005 / AFMC-2001

Ans. (b) : In Sycon, development indirect i.e., development occur through larval form.
Amphiblastula is the larval stage of Sycon.
(a) Parenchymula is the larva of Leucosolenia
(c) Redia is the larval stage of *Fasciola hepatica* (liver fluke) but not sponge.
(d) Trochophore larva is found in annelids and molluscs.

175. Choanocyte is the characteristic feature of:
(a) sponges (b) arthropods
(c) annelida (d) none of these

UP CPMT-2011/ Rajasthan PMT-2005
UP CPMT-2002

Ans. (a) : Choanocyte is also called as collar cells, most important specialized cells of sponges having following structural specialities.



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- Protoplasmic partition are microvilli or collar towards spongocoel through which flagellum comes out.
- Cytoplasm with a nucleus and cellular organelles, shows presence of vacuole called contractile vacuole but function is unknown.
- Choanocytes form inner surface of sponge body its flagellum which creates water current and helps in feeding and also takes part in intracellular digestion.

176. Which one of the following statements about all the four of Spongilla, Leech, Dolphin and Penguin is correct –

(a) Penguin is homoeothermic while the remaining three are poikilothermic
(b) Leech is fresh water form while all othersare
(c) Spongilla has special collared cells called choanocytes, not found in the remaining three
(d) All are bilaterally symmetrical

AIPMT (Screening)-2010

Ans. (c) : Spongilla belongs to phylum porifera, in which the characteristic cells are choanocytes, these are absent in leech, dolphin and penguin. These collared cells called choanocytes, are not found in remaining three species. These collared cells which have flagellated structures aid in food capture and movement.

- Dolphin and Penguin are a homeothermic while other two are poikilothermic. Spongilla and leech are the freshwater and penguin and dolphin are marine water animal.
- Spongilla is asymmetrical while other three are bilaterally symmetrical.

177. Which one of the following statements is incorrect?

(a) Insects have one pair of antenna
(b) Millipedes possess two pairs of appendages in each segment of the body
(c) Prawns have two pairs of antenna
(d) Animals belonging to the phylum-Porifera have nematocyst

WB JEE-2015

Ans. (d) : Nematocyst : The nematocyst present in coelenterate are exclusive stinging apparatus of the cnidocytes. It is a distinguishing feature of the phylum coelenterate.

- It helps to capture the prey and serve for adhesion, offence and defense. It also helps in locomotion and food capture.

178. Which of the following characteristic features always holds true for the corresponding group of animals

	Animal	Feature
(a)	**Reptilia**	**3-chambered heart with one incompletely divided ventricle**
(b)	**Chondrichthyes**	**Cartilaginous endoskeleton**
(c)	**Mammalia**	**Viviparous**
(d)	**Chordata**	**Possess a mouth with an upper and a lower jaw**

NEET-2016 Phase-I

Ans. (b) : Chondrichthyes contains the cartilaginous fishes which have endoskeletons composed of cartilage.

- Reptilia have 3-chambered heart, except crocodiles, which have three and half chambered heart.
- All mammalia are viviparous except monotremes, viviparous give birth to young ones and the development of offspring is inside the mother body.
- Chordata possess a mouth with an upper and a lower jaw, but jawless fish don't have any jaw.

179. What is left when bath sponges dries up?

(a) Spicules (b) Spongin fibres
(c) Tentacles (d) Holdfast

JIPMER-2004

Ans. (b) : Euspongia is also known as bath sponge. Sponges are classified on the basis of their skeleton, which is made up of sponging fibres. Only the skeleton is left after the sponge dries.

- Calcareous spicules are made of calcium carbonate.
- Siliceous spicules are made of silica.

180. Spicule, made up of silica are found in

(a) Grantia (b) Sycon
(c) Hyalonema (d) Leucosolenia

UP CPMT-2014
VMMC-2014
AP EAMCET-2001

Ans. (c): Spicule, made up of silica are found in Hyalonema.
Hyalonema is a member of class-hexactinellida of the phylum porifera. It is a marine found in deep sea, has oval body with a spirally twisted root tuft.

181. Which of the following animal can successfully reproduce without utilizing the process of mitosis?

(a) Amoeba (b) Hydra
(c) Tapeworm (d) Sycon

Karnataka CET-2006

Ans. (d) : Sycon can successfully reproduce without utilizing the process of mitosis. Sycon belongs to the phylum porifera.

- In Amoeba reproduction is asexual. It takes place by binary fission, multiple fissions and sporulation. Sycon belongs to porifera.
- Tapeworm can reproduce sexually or asexually. Asexual reproduction by breaking off proglottid segments at the end of the trunk.
- Hydra reproduces asexually by budding and sexually by gemetes formation.

182. Which types of cells absent in sponges?

(a) Trophocytes (b) Myocytes
(c) Archeocytes (d) Cnidocytes

JIPMER-2014
UP CPMT-2006
AMU-2006

Ans. (d) : Cnidocytes are specialized cells that are found in the phylum cnidaria **(sea anemones, jellyfish, corals and hydras)**. They contain an "explosive" organelle called **cnidocyst** that acts as a 600 million-years-old microscopic injection system and is important for prey capture and anti-predator defense.
(a) Trophocytes – In sponges, these cells involved in the digestion and distribution of food.

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(b) Myocytes–Myoytes are elongated, contractile cells, which surround canal openings and pores can contract to regulate flow through the sponge.
(c) Archaeocytes–These cells are totipotent, they have ability to change into all of the other types of sponge cells.

183. Locomotion does not occur in
(a) Amoeba (b) Pheretima
(c) Leucosolenia (d) Maggot of Musca
CG PMT-2011

Ans. (c) : Leucosolenia is calcareous sponge, belong to calcispongiae family and phylum porifera. Locomotion does not occur in Leucosolenia. Except for changes in the porocytes, no mature sponge is capable of locomotion. Some are completely devoid of contractile powers.

184. Which one of the following animal phyla possesses spicule?
(a) Annelida (b) Mollusca
(c) Porifera (d) Platyhelminthes
WB JEE-2012

Ans. (c) : Members of phylum Porifera are commonly known as sponges.
They have cellular level of organization.
They have water transport or canal system.
The body of these animals are supported by a skeleton made up of spicules or sponging fibers. Spicules are composed of either calcium or silica.

185. Canal system in Porifera is not concerned with
(a) respiration (b) nutrition
(c) sexual reproduction (d) none of the above
AFMC-2005

Ans. (d) : Sponges belong to the phylum porifera. Body wall is diploblastic, middle layer is called mesenchyme, which has various kinds of wandering amoebocytes. Body wall contains numerous pores called ostia through which water enters into the body and leads to canal system.
- Having no digestive system, Sponges are holozoic creatures. The choanocytes found in the flagellated chamber of the canal system which assist the food particles to be immediately absorbed.
- In sponges, sexual reproduction takes place through the participation of sperm and ovum.
- Since there is a continuous flow of water because of the canal system, the gaseous exchange takes place between cells of sponges and the flowing water.

186. Which of the following cells are useful for feeding in sponges?
(a) Thesocytes (b) Collar cells
(c) Pinacocytes (d) Sclearocytes
Manipal-2012 / AFMC-2002 AP / EAMCET-1997

Ans. (b) : Sponges are marine primitive organism that belongs to the phylum porifera. Choanocytes are another name of collar cells that line interior of sponges. They help to get water to flow through the sponge. They first whip its flagella back and forth. The water removes the wastes while bringing in nutrients and oxygen.
- The collar cells have sticky collars to attract food particles that are carried in with water.

187. Which is not a larva of sponge?
(a) Tornaria (b) Parenchymula
(c) Stereogastrula (d) Amphiblastula
Manipal-2011

Ans. (a) : Tornaria Larva is found in Hemichordates.
- Animals of this phylum are worm-like, brittle and soft.
- The body is divided into 3-parts
  (i) Proboscis
  (ii) Collar
  (iii) Trunk
- The animals have tornaria larva just like bipinnaria larva of Echinodermata in their developmental stage.
- Stereogastrula or Parenchymula larva is found is Leucosolenia.
- Amphiblastula larva is found in Scypha.

188. Which of the following are also known as collar cells?
(a) Choanocytes (b) Pinocytes
(c) Thesocytes (d) Cnidoblast
Manipal-2004 / AMU-2005
Uttarakhand PMT-2004

Ans. (a) : The interior body wall of sponges is lined with distinct cell called choanocytes also referred to as collar cells. These cells contain a collar of microvilli around the central flagellum. In Sponges, they create a sort of cell layer called choanderm.

189. Air bladder is present in
(a) chondrichthyes (b) star fishes
(c) actinopterygii (d) flying fishes
DUMET-2010

Ans. (c) : Air bladder is found only in bony fishes. It is a sac-like outgrowth form the dorsal wall of the oesophagus. It is hydrostatic in function and in some cases help in respiration as well it provides bounce to the fishes and helps them in swimming.
- The actinopterygians, or Ray-finned fish, are one of the 2 major classes of bony fish (osteichthyes), the other being the lobe-finned fish, or sarcopterygians.

190. Fresh water bony fish survives by
(a) get rid of H_2O and gain salt
(b) get rid of salt and gain H_2O
(c) Both [a] and [b]
(d) None of the above
DUMET-2008

Ans. (a) : Marine bony fish typically lose salt and pick up water because their internal osmotic concentration is lower than the surrounding water. Marine fishes lose a lot of water through osmosis to their surroundings. To compensate they have to drink a lot of water and secrete excessive salt form their gills to the surrounding sea water.

191. Which type of scales are found in Chondrichthyes ?
(a) Gonoid (b) Cycloid
(c) Placoid (d) Ctenoid
UP CPMT-2012

Ans. (c) : Placoid scales are found in chondrichthyes. Placoid scales are also called denticles. The placoid scales are structurally homologous to the vertebrate teeth" denticle" with a central pulp cavity supplied with

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blood vessels, that is surrounded by a conical layer of dentine, all of which sits on top of a rectangular basal plate that rests on the dermis.

• These scales are found in cartilaginous fishes as such sharks, rays and chimeras.

192. The commercial bath sponges belongs to :

(a) Protozoa (b) Porifera
(c) Coelenterata (d) Echinodermata

JIPMER-1999

Ans. (b) : The commercial bath sponges belongs to Porifera. They are multicellular organism, sessile and sedentary in nature. Euspongia is a commercial used sponge, commonly known as bathe sponge. It is found across the mediterranean sea. It belongs to the class 'Desmospongiae' under the phylum 'Porifera' of animal kingdom'.

193. Which fish selectively feeds on the larva at mosquito?

(a) Gambusia (b) Rohu
(c) Clarias (d) Exocoetus

BHU PMT (Screening)-2010
BVP-2008

Ans. (a) : Gambusia affinis and poecilia reticulata are the two most important larvivorous fish which have been used extensively in the country for the control of mosquito breeding in urban area. Both these fish though exotic but have acclimatized very well in different types of climatic conditions prevailing in the country.

194. The pH of the avian blood is maintained by

(a) HCO_3^- (b) $H_2PO_4^-$
(c) CH_3COO^- (d) Cl^-

KVPY SA-2016

Ans. (a) : Bicarbonate (HCO_3^-) ions keep the pH of avian blood constant. The body of avian contains a number of buffering system that serve to regulate the pH between 7.33 & 7.45.Since bicarbonate ion is a base, it helps neutralise the acid in the blood and increase the pH above 7.

195. Food storage in Leucosolenia occur by :

(a) ostia (b) osculum
(c) thesocyte (d) spongocoel

MGIMS Wardha-2005

Ans. (c) : Food storage in Leucosolenia occur by thesocyte. The thesocytes of sponges are usually binucleate and are packed with yolk platelets. They store food in the form of basic proteins and glycoproteins.

196. Sponges are :

(a) pelagic (b) free-swimming
(c) planktonic (d) sessile

VMMC-2005
AMU-2004
BCECE-2006

Ans. (d) : All the sponges are sessile, meaning they cannot move around. Adult sponges are sessile and they are not able to walk from place to place. They are generally found in freshwater but survive in a marine environment. They do not have well developed locomotary organs.

197. Which of the following groups is a side line in the process of evolution?

(a) Porifera (b) Annelids
(c) Echinodermata (d) None of these

AMU-2011

Ans. (a) : Phylum porifera is a group of simple aquatic animals that lack true tissues, organs and symmetry. They are regarded as side line to the major trends of evolution. Porifera possess cellular level organisation and their individual cells functioning independently, they lack in the coordinated patterns of cell functions found in more specialized tissues or organs of other animal phyla.

198. Branch of zoology dealing with the study of fishes is called

(a) Arthrology (b) Ichthyology
(c) Saurology (d) Herpetology

Uttarakhand PMT-2009

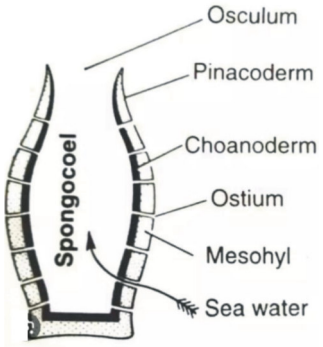
Ans. (b) : Ichthyology is the scientific study of fishes which is concerned with a large group of organism and a number of specialized sub disciplines for example taxonomy, anatomy, ecology physiology and behavioral science.

199. The type of canal system found in Leucosolenia is

(a) ascon type (b) sycon type
(c) leucon type (d) aphodal type

UP CPMT-2001

Ans. (a) : The type of canal system found in Leucosolenia is 'Ascon type'. The colony consists of few simple vase-like, cylindrical individuals each terminating in an osculum and united at their bases by irregular horizontal tubes. Leucosolenia reproduces both asexually and sexually.



200. A metazoa without tissue organisation is called:

(a) parazoa (b) protozoa
(c) eumetazoa (d) dermatozoa

Manipal-2000

Ans. (a) : A metazoa without tissue organization is called parazoa. Parazoa include multicellular sponges and lack true tissues. They do not show tissue-level organization, although they do have specialized cells that perform specific functions.

201. The following are the statements about Parazoa:

1. Includes red algae, fungi and sponges
2. Multicellular animals
3. Tissues and organ systems are absent
The correct combination is:

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(a) 1 and 3 only are correct
(b) 1 and 2 only are correct
(c) All are correct
(d) 2 and 3 only are correct

AP EAMCET-2004

Ans. (d) : Parazoa is a group of invertebrates that contain sponges. They are multicellular organism with a loose cellular organization. They are asymmetrical organisms.
Tissue and organs system are absent. These animals have pores in their entire body which help them in the movement of water.

202. Which cells are found only in sponges?
(a) Amoeboid cells (b) Choanocytes
(c) Pigment cells (d) Gland cells

Haryana PMT-2005

Ans. (b) : Choanocytes cells are found only in sponges. They are the cells that line the inner surface of spongocoel and canals of porifera. They possess flagella and the cooperative movement of flagella filters help in creating a flow channel for water.

203. Water vascular system is characteristic of
(a) Protozoa (b) Porifera
(c) Annelida (d) Echinodermata

CG PMT-2009

Ans. (d) : The water vascular system is a hydraulic system utilized by echinoderms, such as Sea stars and Sea urchins, for locomotion, food and waste transportation, and respiration. The system is made up of canals connecting numerous tube feet.
Water vascular system is characteristic of the phylum Echinodermata, water flow through this system enabling gaseous exchange, nutrition, predation and locomotion.

204. A sponge differs from all other matazoans in having :
(a) nerve cells
(b) absence of blood
(c) numerous mouthlets and one exit
(d) none of these

JIPMER-2000

Ans. (c) : A sponge differs from all other metazoans in having numerous mouthlets and one exit. Metazoans are multicellular and belong to the kingdom Animalia. Examples of metazoans are flatworms, arthropods, birds reptiles and mammals.

205. Which one of the following is a fresh water sponge?
(a) Euplectella (b) Spongilla
(c) Euspongia (d) Sycon

JIPMER-2000

Ans. (b) : Spongilla is a fresh water sponge. They come under the genus of freshwater sponges with over 200 different species. Spongilla was first publicly recognized in 1696 by Leonard plukenet and are found in lakes, ponds and slow streams.

206. Sponges have evolved from
(a) ciliates (b) flagellates
(c) protozoans (d) choanoflagellates

Manipal-2013

Ans. (d) : Sponges have evolved from choanoflagellates. In choanoflagellate colonies, every cell can feed. To become a sponge, the majority must abandon feeding as collar cells, lowering feeding potential dramatically.

207. Heterocercal tail is found in:
(a) cartilaginous fishes (b) bony fishes
(c) whale (d) amphibians

VMMC-2011, 2007 / UP CPMT-2010
J&K CET-2006

Ans. (a) : Heterocercal tail is found in the cartilaginous fish. They are cold-blooded animals and belong to chondrichthyes class, for example - Sharks, Scoliodon.

208. Which of the following is different?
(a) Rodent (b) Lamprey
(c) Bat (d) Fish

JIPMER-1995

Ans. (b) : A lamprey belongs to cyclostomata class. These are primitive vertebrates that lack jaws and do not have paired fins.

209. Swim bladder is present in
(a) star fishes (b) bony fishes
(c) carp fishes (d) All of these

AMU-2005
Manipal-2003

Ans. (b) : Swim bladder is also called air bladder, is a buoyancy organ that are found in bony fishes and is acquired from an outpocketing of the digestive tube.

210. Torpedo is commonly known as
(a) sucker fish (b) electric ray
(c) globe fish (d) sea horse

VMMC-2005
AMU-2004

Ans. (b) : Torpedo is generally known as electric ray due to the presence of a pair of electric organs, one either side of the body between head and the pectoral fins.

211. Which is the only phylum in the animal kingdom without any nerve cell ?
(a) Porifera (b) Coelenterata
(c) Annelida (d) Nematoda

AMU-2012

Ans. (a) : Porifera is the only phylum in the animal kingdom without any nerve cell. They relying on water flow through their canal system for their food and oxygen. They do not have any nerve cells or sensory cells. However, touch or pressure to the outside of a sponge can cause a local concentration of its body.

212. Digestion in Leucosolenia and other sponges is
(a) Only extracellular
(b) Only intracellular
(c) First extracellular, then intracellular
(d) First intracellular, then extracellular

MGIMS Wardha-2011

Ans. (b) : Lecucosolenia is a group of Calcareous sponges. They are small-bodies, soft branching and colonial marine sponges.
- Sponges have a cellular level of organization and therefore, they do not have any organ system.
- Due to the absence of an organ, the digestion is intracellular, digestion occurs in food vascuoles only.

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213. Sponges have originated from
(a) ciliate protozoans
(b) sporozoan protozoans
(c) sarcodine protozoans
(d) choanoflagellate protozoans

BHU PMT (Screening)-2011

Ans. (d) : Sponges may have originated from flagellated protozoans. The choanocytes of sponges are similar to the choanoflagellate protozoans. The primitive structures of the porifera shows affinities with certain types of protozoans.
- Choanoflagellida have a transparent food gathering collar of cytoplasm around the base of the flagellum.
- They are solitary and sessile with or without a stalk.

214. Hydra can paralyse prey by
(a) nematocysts (b) tentacles
(c) mouth (d) None of these

BHU PMT (Screening)-2011

Ans. (a) : Nematocyst is the specialized cell present in the tentacles of hydra which also known as cnidocyte. It contains neurotoxin that protects in self-defense and to catch preys. Hydra have four types of nematocysts on their tentacles and ectoderm.

215. Which of the following is a viviparous fish?
(a) Exocoetus (b) Gambusia
(c) Clarias (d) Labeo

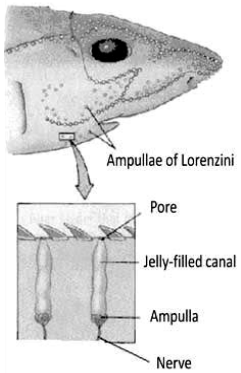
DUMET-2009

Ans. (b) : Gambusia is a genus that belong to poeciliidae family of viviparous fish. They are viviparous, which means after the gestation of a brood, the female will have a live birth. It is a fresh water fish and are quite smaller than fresh water fishes.
Gambusia is also known as mosquito fish because the fish eats mosquito larvae for the biological control of mosquitoes.

216. Ampullae of Lorenzini are present in
(a) fish (b) lizard
(c) frog (d) rabbit

DUMET-2009

Ans. (a) : Ampullae of Lorenzini are electroreceptor, sense organs that have potential to detect electric field. They form a network of mucus- filled pores in the skin of cartilaginous fish (sharks, rays) and of basal bony fishes such as reedfish, sturgeon and lungfish.



217. An example of Scyphozoa is:
(a) jelly fish (b) cuttle fish
(c) silver fish (d) cat fish

AP EAMCET-2011, 2000

Ans. (a) : Scyphozoa is an example of jellyfish. They comes under the marine class of the phylum Cnidaria which is generally known as true jellyfish.

218. An example for the group which is considered as blind alley in animal kingdom is:
(a) Chalina (b) Chelone
(c) Chamaeleon (d) Chiroptera

AP EAMCET-2000

Ans. (a) : Chalina belongs to demosponsgiae class of phylum porifera. Chalina sponge is closed at one end and no higher forms are derived from it. It is also known as 'mermaids or dead man's fingers' because it looks like the fingers of human. Therefore, It is considered as the blind alley of animal Kingdom.

219. Animals devoid of respiratory, excretory and circulatory organs are
(a) sponges (b) threadworms
(c) tapeworms (d) liver fluke

CMC Ludhiana-2010

Ans. (a) : Animals devoid of respiratory, excretory and circulatory organs are sponges. They are the simplest multicellular animals. They have no organ system like respiratory, Excretory and circulatory and are characterized by numerous canals and chambers.

220. Bath sponges are formed from
(a) Euplectella
(b) dried spongin fibre skeleton
(c) skeleton of Spongilla
(d) dry Leucosolenia

Haryana PMT-2011

Ans. (b) : Dead and dried skeleton of spongin fibres are utilized as bath sponges. Euspongia is commonly known as bath sponges. It is because of its texture, which is made up of fuzzy, sponge-like fibres.
They are found in mediteranean sea, red sea etc.

221. Flying fish is
(a) Scoliodon (b) Hippocampus
(c) Exocoetus (d) Torpedo

AMU-2002

Ans. (c) : Exocoetus is a bony fish which is also known as flying fish. The body is covered with cycloid scales. The mouth is wide, and the jaws bear teeth. It is a marine fish. The tail has hypobatic fins like the ventral lobe which help them to glide in the air.

222. Salmon fishes are also known as
(a) cod fish (b) trout
(c) cartilaginous fish (d) bony fish

AMU-2002

Ans. (b) : Salmon fishes are also known as trout. It is general name for a number of carnivorus freshwater. They belong to the genera oncorhynchus, salmo and salvelivus.
- Cod is the common name for Gadus fish.

223. Hydra does not perform locomotion by:
(a) looping (b) somersaulting
(c) jet propulsion (d) walking

VMMC-2003

Ans. (c) : Hydra are generally sedentary but move during hunting. They move by two distinct methods, looping and somersaulting. By this process a Hydra can move to several inches in a day. Hydra is a genus of small freshwater organism belonging to phylum cnidaria and closs hydroza.

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C. Coelenterata (Cnidaria)

224. Which of the following animals is called 'Portuguese man-of-war' ?
(a) Physalia sp. (b) Periplaneta sp.
(c) Hirudinaria sp. (d) Plasmodium sp.
Tripura JEE-2017 / BVP-2008
Uttarakhand PMT-2007 / BVP-2005
Haryana PMT-2004

Ans. (a) : Physalia is known as the Portuguese man of war. It is a marine hydrozoan of the family physaliidae found in the Atlantic, Indian and pacific oceans. It has numerous venomous microscopic nematocytes which deliver a painful sting powerful enough to kill fish and has been known to occasionally kill humans.

225. Polyp phase is absent in
(a) Hydra (b) Aurelia
(c) Physalia (d) Obelia
VMMC-2012 / JIPMER-2009
UP CPMT-2008 / Rajasthan PMT-2008
CG PMT-2008

Ans. (b) : Cnidarians exhibits two basic body forms called polyp and medusa.
Polyp is a sessile and cylindrical form like Hydra Adamsia etc.
Where medusa is umbrella-shaped and free-swimming like Aurelia or Jelly-fish.
Aurelia belong to class scyphozoa that contains the jelly fishes. They are mainly marine and free floating through they can "swim". In this class the polyp stage in either reduced or absent.

226. In sea anemone, the symmetry is
(a) radial (b) bilateral
(c) spherical (d) absent
Manipal-2010 / AMU-2009
JIPMER-2008 / J&K CET-2007
CMC Ludhiana-2007 / UP CPMT-2004
MGIMS Wardha-2004

Ans. (a) : All cnidarians (e.g. sea anemone) and echinoderms (e.g. star fish) are radially symmetrical and typically sessile in adult form. Radial symmetry, separates the body into two halves along any control axis. Radial symmetry is the arrangement of body parts around a central axis. Radially symmetrical animals posses top and bottom surfaces, but no left and right side. The two halves of a radially symmetrical animals are called the oral side and aboral side.

227. In Hydra, which substance of nematocyst worked as hypnotizing substance ?
(a) Glutatheone (b) Heparin
(c) Histamin (d) Hypnotoxine
CMC Ludhiana-2008 / AMU- 2006
Uttarakhand-2005 / Manipal-2000
Rajasthan PMT-1999

Ans. (d) : Largest Cnidoblast (nematocyst) is penetrant type which inject Hypnotoxin in the prey. Hypnotoxin can't kill the prey, only paralyses.

228. Which of the following is colourless Hydra?
(a) Hydra jusca (b) Hydra viridis
(c) Hydra oligactis (d) Hydra vulgaris
(e) All of the above
CMC Vellore-2015 / Uttarakhand-2005
Punjab MET-2003 / DUMET-2001

Ans. (d) : The commonly occurring colourless Indian species is Hydra vulgaris belong to phylum coelenterata. The Hydra is solitary fresh water animals and cosmopolitan in distribution.
Tubular body respresenting polystage body differentiated in three parts-pedal disc, hypostome and trunk.

229. Characterisitc of coelenterata is occurrence of:
(a) Nematocysts (b) Polymorphism
(c) Flame cells (d) Choanocytes
VMMC-2010 / AMU-2008
AP EAMCET-2005 / UP CPMT-2001

Ans. (a): Coelenterates have nematocyst Nematocysts are stinging cell. Nematocysts are mainly concerned with food capture, defense and attachment.
They have the special types of cells called **nematocysts**, are present in coelenterata only. These cells are used for food catching defensive and offensive purposes.
• Coelenterates are acoelomate. They have a single opening which acts as mouth and anus.
(b) Polymorphism is the ability of an object to take on many forms.
(c) A flame cell is specialized excretory cell found in the simplest freshwater invertebrates, including flatworms, rotifers and nemerteans. Flame cell functions like a kidney, removing waste materials.
(d) Choanocytes, are grouped within chambers. They are the main 'pumping station' for sponge survival.

230. The characteristic larva of phylum-'Coelenterate' is
(a) Planula (b) Cysticercus
(c) Rhabdiform (d) Wriggler
VMMC-2012 / JIPMER-2009
MGIMS Wardha-2008 / UP CPMT- 2008

Ans. (a) : The characteristic larva of phylum coelenterate is planula. Planula, plural planulae, free-swimming or crawling larval type found in many species of the phylum cnidaria.
Example : – Jelly fish, corals, and sea anemones.
• Wriggler is a larvae of mosquitoes.
• Rhabdiform larvae nematodes is a feature of (roundworm).

231. Hydra recognises its prey by:
(a) nematocyst (b) chemical stimulus
(c) Smell (d) sensitivity
BVP-2001 / AIIMS-1996
Manipal-2001 /VMMC-2004

Ans. (a) : Hydra recognizes its prey by nematocyst. Nematocyst are stinging cells of hydra. Nematoblasts of cnidoblasts produced nematocyst used for capturing and paralyzing the prey. The nematocyst consists of coiled and hollow thread consists of barbs or spines and also contains poisons. Hydra is carnivorous and feed on small insect larva. They are solitary in habit and reproduce sexually as well as asexually.

232. Stinging capsules (nematocysts) are found in
(a) wasp and honeybee
(b) scorpion and cobra
(c) sea pen and sea fan
(d) cactus and Venus flytrap.
AIIMS-2013/ JIPMER-2006
UP CPMT-2005, 2003

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Ans. (c) : Stinging capsule (Nematocysts) are the organs of offence and defence, present in the phylum Coelenterata. **Sea pen and Sea fan** are members of this phylum.

- Nematocysts have specific capsules known as cnidoblasts cell. They have most common intracellular secretion products. Nematocysts belong to the phylum Coelenterata. In coelentrates, a cavity called coelentron or gastrovascular cavity is present with single opening called-mouth, this cavity help in digestion and circulation.

233. Digestion is both extracellular and intracellular in

(a) Cnidaria (b) Platyhelminthes
(c) Nemathelminthes (d) Mollusca

AP EAPCET-12.07.2022 Shift-I

Ans. (a) : Digestion is both intracellular and extracellular in Cnidaria and Ctenophora. Cnidaria have an incomplete type of digestive system. The gastro-vascular cavity has only one opening both for intake of food and removal of wastes. Intracellular digestion occurs only in Protozoa and Porifera.

234. The symmetry of Aurelia is

(a) Spherical (b) Radial
(c) Biradial (d) Bilateral

TS EAMCET-31.07.2022 Shift-I

Ans. (b) : The symmetry of Aurelia is radial symmetry. The Aurelia has a distinct tetramerous (4 part) radial symmetry arranged around the oral aboral axis.
There are four oral arms, four gonads, four subgenital pits, four gastic pouches and four or eight of each type of radial canal.
The mouth has four corners and there are eight sense organs.

235. The most primitive and the slowest type of locomotion in protozoans

(a) Gliding locomotion
(b) Amoeboid locomotion
(c) Ciliary locomotion
(d) Euglenoid locomotion

AP EAMCET-12.07.2022 Shift-II

Ans. (b) : The most primitive kind of movement in protozoa is called amoeboid movement. It is caused by contractility and is also the characteristic of sarcadina and many sporozoa. Amoeboid movement is made by the throwing of pseudopodium.

236. Nocturnal periodicity is exhibited by

(a) Trophozoites of plasmodium
(b) Sheathed microfilaria larvae of Wucheraria
(c) Sausage shaped larvae of Wuchereria
(d) Sporozoites of plasmodium

TS EAMCET-09.05.2019 Shift-I
TS EAMCET-30.07.2022 Shift-II

Ans. (b) : Nocturnal periodicity is a circadian rhythm with the periodicity expressed during night time. Mycrofilariae show nocturnal periodicity i.e day and night moment. When organism movement occur in night called nocturnal moment, at night or during sleep they came into superficial or peripheral vessels in skin to be sucked by nocturnal mosquitoes (Culex or Aedes) which serve as intermediate host.

237. 'Lasso' is a structure found in _____

(a) Nutritive muscular cell
(b) Epithelial muscular cell
(c) Nematoblasts
(d) Nerve cell

AP EAPCET-07.09.2021 Shift-I

Ans. (c) : Modern carnivorous fungi capture and kill tiny nematode worms that come to feed on them. Some produce sticky structure that the nematodes gets stuck in, other grow small loops that act like a lasso when the nematodes go through when the nematode dies, the fungus penetrates the worm and digest it.
Lasso is defence mechanism is an nematoblast. It is a coiled structure which is stored in a state on relicol tension (spring tension) on affroching danger the lasso is ejected at a high tension.

238. Which of the following statements regarding coelenterates are correct?

(i) Cnidoblasts present mostly on the tentacles and the body
(ii) Digestion is both extra and intracellular
(iii) Polypoid forms are free swimming
(iv) Some exhibits metagenesis
(v) Development includes a free-swimming ciliated larva the planula

Options:

(a) Except (iii), all are correct
(b) Except (iii) & (v) all are correct
(c) Except (i) & (iii), all are correct
(d) Except (ii) & (v), all are correct

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : Cnidoblasts present mostly on the tentacles and the body, have a poison filled capsule.

- Digestion is both extra and intracellular in coelenterates.
- Some exhibits metagenesis.
- Development includes a free-swimming ciliated larva the planula.
- Polypoid forms are sessile and medusa form are free swimming.

239. Select the incorrectly matched pair from following :

(a) Osteocytes – Bone cells
(b) Chondrocytes – Smooth muscle cells
(c) Neurons – Nerve cells
(d) Fibroblast – Areolar tissue

NEET-2020 Phase-II

Ans. (b) : Chondrocytes are cartilage cells. The intercellular material is solid, pliable and resists compression. They produce to maintain the cartilaginous matrix, which consists of collagen and proteoglycan.

- Neurons (or) nerve cells are the structural and functional unit of nervous system.
- Fibroblasts are resident cell in the adipose tissues. They synthesize the extracellular matrix and collagen, produces the structural framework (stroma) for animal tissues, and plays a critical role in wound healing.
- Osteocytes derive from osteoblasts or bone-forming cells, and are essentially osteoblasts. Surrounded by the products they secreted.

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240. Find out the correct option about Coelenterata:
(a) Cnidoblast and bilateral symmetry
(b) Cnidoblast and radial symmetry
(c) Choanocytes and water canal system
(d) All marine and only sexual reproduction

AIIMS-26.05.2018 Shift-I

Ans. (b) : Cnidobasts are unique stinging cell found in Coelenterata. These are used for anchorage, defense and for the capture of prey. Coelenterata shows radial symmetry.
- Choanocytes are specialised cells of sponges. Coelenterates are mostly marine but also have some fresh water forms. Reproduction may be either sexual or asexual.

241. What is the symmetry of medusa?
(a) Bilateral (b) Radial
(c) Asymmetrical (d) Biradial

JIPMER-2018

Ans. (b) : Most coelenterates shows radial symmetry. They shows two life forms (diamorphism), tubular polyp and circular medusa.
Medusa is shaped like an umbrella shows radial symmetry. The outer convex surface is known as exumbrella, while the inner concave surface is called subumbrella.
The subumbrellar surface shows four radial canals and circular canal of the gastrovascular system.

242. 'Comb-plate' is the characteristic feature of
(a) Ctenophora (b) Echinodermata
(c) Mollusca (d) Annelida

Tripura JEE-2017

Ans. (a) : Comb-plate is the characteristic features of Ctenophora. Ctenophora are commonly known as sea whales or comb Jellies, radially symmetry, diploblastic organisms with tissue level of organization. Ctenophores lack nematocyst, they possess colloblasts cells that produce a sticky secretion which captures prey.

243. In which animal nerve cell is present but brain is absent : -
(a) Sponge (b) Earthworm
(c) Cockroach (d) Hydra

Rajasthan PMT-2007
AIPMT-2002
BVP-2002

Ans. (d) : In Hydra nerve cells are present but brain is absent. It is a member of the phylum coelenterata. Its nervous system is made up of nerve cells and their process.
- Sponges do not have the nervous system. They are the only multicellular animals without a nervous system.
- Both earthworm and cockroaches have a brain.

244. Which of these is not a cnidarian?
(a) Jellyfish (b) Silverfish
(c) Sea anemone (d) Physalia

Uttarakhand PMT-2011

Ans. (b) : Silverfish is not a cnidarian. The scientific name of the silver fish is *Lepisma saccharina*. They belong to the phylum Arthropoda and class insecta.
- Scyphozoa are commonly called true Jellyfish.
- Sea anemone is that the scientific name of the creature is also Actiniaria.
- Physalia is commonly called Portuguese man of war.

245. The true statement regarding corals is:
(a) form branch colonies
(b) solitary or colonial
(c) grow as massive bodies
(d) all of the above

AIIMS-1999

Ans. (d) : Corals are marine invertebrates within the class anthozoa of the phylum coelenterata.
Coral are polypoid coelenterates. They may be solitary e.g.- Fungi or colonial e.g.- Madrepora.
- The colonial corals grow continuosly into massive bodies and form coral reefs.
- Corals are found mainly in the tropical oceans and seas.
- Corals form branch colonies of individual polyps.

246. Penetrant, valvent and glutinant are type of
(a) nematocyst of Hydra
(b) tentacles of Hydra
(c) zooids of Obelia
(d) tentacles of Obelia

CMC Vellore-2013

Ans. (a) : Penetrant, valent and glutinant are the types of nematocysts of Hydra and not the types of tentacles of Hydra. Tentacles of Hydra are the extension of the body layer that encircles the opening of the mouth.
Penetrant is also known as stenotele. It paralyzes the prey by releasing poisonous fluid. Glutinant is a sticky surface used to stick to prey. Valvent is also known as desmosome. It is smallest nematocyst.

247. The type of asexual reproduction found in Hydra is
(a) Multiple fission (b) Budding
(c) Sporulation (d) Binary fission
(e) Gemmule formation

Kerala PMT-2009

Ans. (b) : Budding, a type of asexual reproduction is found in hydra. A bud develops from an outgrowth. These buds develop externally and when fully mature, detach from the parent body as a new individuals.
- Binary fission is a type of asexual reproduction in which a cell divide to form two daughter cells.
- Gemmules are internal buds in sponges and help in asexual reproduction.
- Sporulation is an asexual reproduction in which spores are formed from the vegetative cells during unfavourable conditions.

248. Choose the correct pair
(a) Radial symmetry – Coelenterates
(b) Coelomates – Aschelminthes
(c) Metamerism – Molluscs
(d) Triploblastic – Sponges
(e) Metagenesis – Echinoderms

Kerala PMT-2012

Ans. (a) :
(A) Radial symmetry – Coelenterates
(B) Coelomates – Annelida to chordata
(C) Metamerism – Annelids
(D)Triploblastic–Platyhelminthes, molluscs, Anthropods, chordates
(E) Metagenesis – Obelia

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249. Coral reef formation is mainly related to
(a) sponges (b) anthozoans
(c) molluscs (d) hydrozoans.
AMU-1995

Ans. (b) : Coral reef formation is mainly related to Anthozoans. Coral refers to a particular class of animal belonging to phylum coelenterata. It is a soft-bodied radially symmetrical marine invertebrate which secretes a calcareous skeleton. Coral reefs form as live polyps build not only on each other, but also on the skeleton remains of previous coral. As a result they are able to create massive structure like the Great Barrier Reef.

250. The poisonous fluid present in nematocysts of Hydra is:
(a) toxin (b) venom
(c) hematin (d) hypnotoxin
AMU-2006
AIIMS-2000

Ans. (d) : Nematocysts are venom-containing stinging organelles located in cnidocytes in cnidarians. The poisonous fluid present in nematocysts of Hydra is hypnotoxin.
Hypnotoxin is a mixture of protein and phenol. This fluid is injected in the body of prey with the help of pointed needle shaped structure called barb & spicules. Hypnotoxin can't kill the prey, it only paralyzes.
The nematocyst is used for defence response of Hydra.
Any poisonous substance is called toxin. Venom is a toxin which is present in some animals such as snakes, bees, scorpion, etc.

251. Metagenesis refers to :
(a) Presence of a segmented body and parthenogenetic mode of reproduction
(b) Presence of different morphic forms
(c) Alternation of generation between asexual and sexual phases of an organism
(d) Occurrence of a drastic change in form during post-embryonic development
AIPMT (Re-Exam)-2015

Ans. (c) : Metagenesis refers to the alternation of generation between sexual and asexual phases of an organism during its life cycle.
- In coelenterates, metagenesis is alternation of generation between polyp and medusa phase. Polyp reproduces asexually by budding to form medusa and medusa reproduces sexually to form polyp.
- Metagenesis and metamorphosis both term are different in mutagenesis. Metagenesis is alternation of generation but in metamorphosis organism produce distinct stages during its life cycle like egg, larva, pupa and adult.

252. Select the Taxon mentioned that represents both marine and fresh water species.
(a) Echinoderms (b) Ctenophora
(c) Cephalochordata (d) Cnidaria
AIPMT-2014

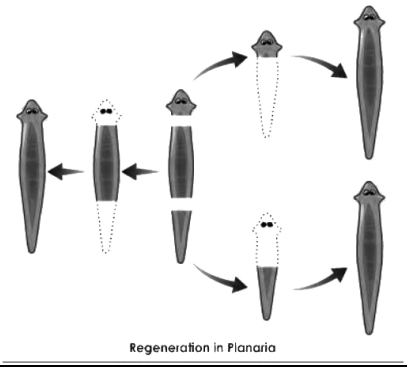
Ans. (d) : Cnidaria phylum is notable in the animal kingdom for exhibiting polymorphism. Most of them are marine and other are fresh water. Example- fresh water cnidarian Hydra and marine cnidarians - Jellyfish, sea anemones, sea fans etc. While members of ctenophora, cephalochordata, echinodermata are found exclusively in the marine environment.

253. Which one of the following living organisms completely lacks a cell wall?
(a) Cyanobacteria (b) Sea- fan (Gorgonia)
(c) Saccharmyces (d) Blue-green algae
AIPMT-2014
MGIMS Wardha-2003

Ans. (b) : Sea - fan (Gorgonia) belongs to cnidaria class-Anthozoa. They are also known as sea whips or sea fans and are similar to the sea pen, a soft coral. These marine invertebrates are multi-cellular, have no cell walls.
- BGA belong to monera & their cell wall is made up of peptidoglycan.
- Saccharomyces fungi cell wall is made up of chitin.

254. Planaria posses high capacity of.
(a) Metamorphosis
(b) Regeneration
(c) Alternation of generation
(d) Bioluminescence
AIPMT-2014

Ans. (b) : Planaria, belongs to the phylum platyhelminthes and class turbellaria. The body is dorsoventrally flattened.
Planaria possesses a high capacity of regeneration. It can be cut into pieces and each piece can regenerate into a complete organism. Cells at the location of wound site proliferate to form a blastema that will differentiate into new tissues and regenerate the missing parts of the piece of the cut Planaria.
• Bioluminescence is the property of living organism to emit light is well-marked in ctenophores.


Regeneration in Planaria

255. Absence of circulatory system in Hydra is compensated by
(a) pseudocoelomic fluid
(b) gastrovascular cavity
(c) presence of tentacles
(d) none of the above
UP CPMT-2007

Ans. (b) : Absence of circulatory system in Hydra is compensated by gastrovascular cavity, it is the primary digestive organ in mojar animal phyla.
Hydra have a fluid filled cavity called gastrovascular cavity that absorbed nutrients. The Hydra gets oxygen from the water that entered the cavity and gets rid of carbon dioxide through this cavity. They do not have a complete circulatory system i.e. contain only one opening.

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256. Regeneration in Hydra will be faster if it is cut off from
(a) tentacles (b) hypostome
(c) base (d) all of these
UP CPMT-2007

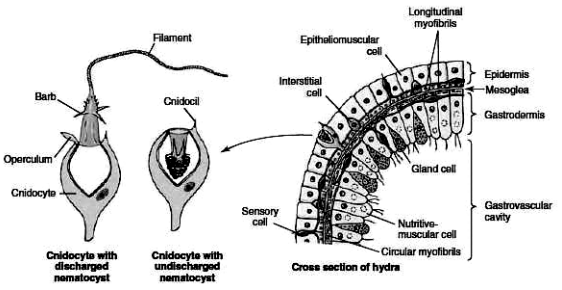
Ans. (a) : Regeneration in Hydra will be faster if it is cut off from tentacles compared with other organs like hypostome, base polyp etc. Regeneration is the ability of an organism to replace its lost or damaged body parts. Hydra has great power of regeneration.

257. Which of the following is not applicable to coelenterate?
(a) choanocytes (b) coelenteron
(c) radial symmetry (d) nematoblasts.
AIIMS-1996

Ans. (a) : Choanocytes is not applicable to coelenterates. Coelenterates have the following characteristic-
The presence of choanocytes is a characteristic feature of the phylum porifera. They contain a flagellum surrounded at its base by a thin cytoplasmic collar cell that maintain the flow of food bearing water.

258. Hydra receives impulses and stimuli through
(a) Nerve net (b) Nematocytes
(c) Sensory cells (d) Neuron cells.
AIIMS-2002

Ans. (c) : In hydra, sensory cells are found in the gastrodermis. They are supposed to be stimulated by the entry of the prey into the gastrovascular cavity.



259. Which of the following is correct about nematocyst in Hydra?
(a) It can be re-used
(b) Its ejection is conditioned reflex
(c) It is ejected on contact and pierce the prey
(d) Due to which other Hydra doesn't come in contact with it.
AIIMS-2001

Ans. (c) : Nematocysts are the stinging cells and are the organs of offence and defense of coelenterates.
- Nematocysts contains a poisonous proteinaceous fluid, called hypnotoxin along tube which injects the fluid into the victim. Hypnotoxin can't kill the prey only paralyzes.
- Nematocysts are activated in response to chemicals secreted by prey. They explode after coming in contact with the prey.

260. Jelly fish belongs to Class
(a) Hydrozoa (b) scyphozoa
(c) Anthozoa (d) none of these
AIPMT-1989

Ans. (b) : Jellyfish or Aurelia belongs to any planktonic marine member of the class scyphozoa (phylum Cnidaria). Jellyfish are not real fish.
Their stings may cause skin rashes, muscles cramps, or even death.

261. Which one of the following animals possesses nerve cells but no nerves?
(a) Hydra (b) Tapeworm
(c) Earthworm (d) Frog's tadpole
AIPMT-1993

Ans. (a) : Hydra possesses nerve cells but no nerve because it lacks a brain. It is a member of the phylum coelenterata.

262. One of the special characters of coelenterata only is the occurrence of
(a) polymorphism (b) flame cells
(c) hermaphroditism (d) nematocysts
AIPMT-1994

Ans. (d) : Special type of cells called nematocytes are present in only coelenterata, these cells are used for anchorage, defence and for the capture of pray.

263. Symmetry in Cnidaria is
(a) radial (b) bilateral
(c) pentamerous (d) spherical
Punjab MET-2008
JCECE-2012

Ans. (a) : Symmetry in Cnidaria is radial. Coelenterata (cnidaria) are aquatic, sessile or free swimming radial symmetrical animal.
They are diploblastic and acoelomate organism that do not have a true body cavity and mesoglea is present instead of mesoderm.

264. Portuguese man of war is:
(a) Portuguese soldier
(b) A sponge
(c) A coelenterate
(d) Soldiers of first world war
JIPMER-1996

Ans. (c) : Portuguese man of war is a coelenterate commonly called physalia.
It is also known as a blue bottle or floating terror this is a hydrozoan with many tentacles that have venomous stinging cells and cause harm to other organism.

265. It employs both intracellular and extracellular digestion:
(a) Hydra (b) Aurelia
(c) Amoeba (d) Planaria
BCECE-2015

Ans. (a) : Hydra is a member of phylum coelenterata (cnidaria). Cnidarian exhibit tissu level of organisation and are diploblastic. They have a central gastro-vasicular cavity with a single opening, mouth on hypostome. It employs both extracellular and intracellular digestion.

266. This is not a Cnidarian:
(a) Obelia (b) Jelly fish
(c) Sea anemone (d) Beroe
BCECE-2015

Ans. (d) : Obelia, Jellyfish and sea anemone belong to phylum Cnidarian.
Beroe belong to phylum Ctenophora also known as comb Jellies or sea walnuts, order Beroida.

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267. The typhlosole in earthworm is related with
(a) excretion (b) absorption
(c) respiration (d) reproduction
WB JEE-2007

Ans. (b) : Earthworm belong to phylum annelida. Typhlosole is an internal fold of the dorsal wall in earthworm. In earthwarm, Typhlosole is present between the 26th to last segment except the 23rd - 25th segments from the last folded portion increases the surface area for the absorption of food in the intestine of earthworm. It has a tubular digestive system which includes the pharynx, oesophagus, crop intestine and gizzard that is used for crushing the food.

268. Blind sac body plan is shown by
(a) roundworms (b) annelids
(c) coelenterates (d) arthropods
WB JEE-2007

Ans. (c) : Blind sac body plan is shown by coelenterates and flatworms. In this type of body plan animals have single opening that acts as both mouth and anus eg-Hydra.

269. One of the characteristic of Hydra is :
(a) predation (b) metamerism
(c) hibernation (d) mimicry
Punjab MET-2006
Rajasthan PMT-2002
JCECE-2003

Ans. (a) : One of the characteristic of Hydra is predation because, it is exclusively carnivorous.
- Hydra obtained food as a predator.
- Prey are mostly aquatic animal like insects and egg of small fish etc.

270. Female reproductive organ of Ascaris are :
(a) protandrous (b) polydelphic
(c) didelphic (d) monodelphic
Rajasthan PMT-1999

Ans. (c) : Female reproductive organ in Ascaris is didelphic because it has two ovaries. It is tube-like structure long, thin and coiled.
Oogonia is produced by budding from a single large germinal cell that forms each ovarys' proximal germinal zone.

271. Hydra is :
(a) triploblastic, radial symmetrical and acoelomate
(b) triploblastic, radial symmetrical and coelomate
(c) diplobalstic, radial symmetrical and acoelomate
(d) diploblastic, radial symmetrical and coelomate
Rajasthan PMT-1999, 1995

Ans. (c) : Hydra belong to class Hydrozoa of Cnidarians. Cnidarians have radial symmetry and diploblastic body plan. They are acoelomate and have a central digestive cavity (gastrovasclar cavity). In Hydra, tubular body shows polyp stage, 1/3 part of body wall is made by ectodermal cells and 2/3 part by endodermal cells. In between endoplasm and ectoplasm non cellular jelly like mesoglea is present for attachment of two layers.
It has a single opening to serve as both mouth and anus.

272. How many ovum are developed in ovary of Hydra ?
(a) Two (b) Many
(c) One (d) Three
MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (c) : Hydra can reproduce both asexually and sexually. It produces asexually by budding and sexually by the formation of gametes. A bud from the tubular body of an adult develops a mouth and tentacles. The male reproductive organ produces sperms and the females reproductive organ produces a single egg, a fusion of which result in the formation of zygote, no larval stage found, development is direct.

273. Hydra does not perform locomotion by :
(a) looping (b) somer saulting
(c) jet propulsion (d) walking
Haryana PMT-2001

Ans. (c) : Hydra is generally sessile or sedentary, but they move for hunting. Hydra perform locomotion by looping, walking and somer saulting but does not perform jet propulsion.
Jet propulsion is that they contract their hollow saucer shaped bodies to force water out which propels them forward.

274. Hydra can paralyse prey-toy:
(a) nematocysts (b) tentacles
(c) mouth (d) none of these
J&K CET-2001

Ans. (a) : Nematocyst is the specialized cell in the tentacles of Hydra, called as Cnidocyte which carries neurotoxin and projects in self-defence to catch preys.
When neurotoxin comes in contact with prey it paralyzes them by suppressing the activity of the nervous system.
Hydra capture their food by paralyzing and killing the food organism by means of nematocysts, which are discharged into the prey. The prey is brought to the mouth (proctostome) by the tentacles, a response that in induced glutathione.

275. Sperms of Hydra formed from:
(a) Interstitial cells
(b) Epithelial muscular layer
(c) Nerve cells
(d) All of the above
Rajasthan PMT-1995

Ans. (a) : In Hydra testis releases sperm cells that swim in the water with the help of tail. Interstitial cells of Hydra form a multipotent stem cell system, producing terminally differentiated nerve cells and nematocytes during asexual growth under well-feed condition the interstitial cell population double in size every 4 days.

276. Polyp stage is not present in:
(a) Hydrozoa (b) Scyphozoa
(c) Anthozoa (d) Calcarea
Rajasthan PMT-1995

Ans. (d) : Hydrozoa, Scyphozoa and Anthozoa are classes of the Cnidarians or coelenterate that all have similar body morphology with a polyp and medusa.
The class calcarea consists of sponges from the phylum porifera whose body is covered with a calcareous shell and spicules but no polyp.
Calcareous sponge, any of a class (calcarea) of sponges characterised by skeletons composed entirely of calcium carbonate spicules (needle like structures).

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277. You are examining a water sample from a pond which is full of water plants. You find an animal which is cylindrical and shows a long filamentous structure at one end. It is not stationary and shows variety of movements. It could :

(a) Paramecium (b) Tadpole
(c) Hydra (d) Amoeba

Rajasthan PMT-2001

Ans. (c) : Hydra is a fresh water animal its body is hollow and cylindrical.
To its one end (Hypastome) are attached 4, 6, or 8 contractile projection (Filamentous) known as tentacles. Hydra shows a variety of movement.

- **Paramecium -** Paramecium genus of microscopic single - called and free-living protozoans.
- **Tadpole -** A Tadpole is the larval stage in the biological life cycle of an amphibian.
- **Amoeba -** Amoeba is unicellular organism that has the ability to change its shape.

278. Which of the following is a Coelenterate ?

(a) Sea urchin (b) Sea horse
(c) Sea pen (d) Sea cucumber

Rajasthan PMT-2001

Ans. (c) : Sea pen (Pennatula) are soft corals that are under the class Anthozoa and under the phylum-coeleneterata or Cnidaria. Sea urchin, Brittle star and Sea cucumber are echinoderms.
Characteristics of coelenterate -
These are sac-like animals having a radially symmetrical body, A gastrovascular cavity is present having the same inlet and outlet in these organism reproduction mode is asexual e.g. Hydra and sea anemone, corals, Jellyfish.

279. Ctenophora shows affinities with:

(a) Cnidaria (b) Aschelminthes
(c) Cephalopoda (d) Turbelaria

JCECE-2003

Ans. (a) : Ctenophora shows several affinities with Cnidaria, some of them are :-

- The radial and tetramerous symmetry of the body like the medusa of the Hydrozoans.
- Arrangement of parts along oral-aboral axis.
- Presence of branching gastrovascular canal and absence of coelom.
- Presence of tentacles and statocyst.
- Endodermal nature of gonads etc.
- Cnidarians live in both fresh water and marine habitates while cterophores only live in the sea.
- Both cnidarians and ctenophores are diploblastic animals.

280. Coral reefs are formed by

(a) molluscs (b) coelenterates
(c) protozoans (d) echinoderms

BVP-2011

Ans. (b) : Corals are marine invertebrates belongs to the class anthozoa and the phylum coelenterate. They live in compact colonies of many identical individual polyps form they possess a hard calcium carbonate exoskeleton

281. Which shows polymorphism?

(a) Physalia (b) Trypanosoma
(c) Termite (d) All of these

BVP-2009

Ans. (d) : Polymorphism is a condition in which one animal in its life cycle may have more than one morphology or appearance coelenterate members like obelia, physalia show polymorphism. There are two morphological forms one sessile and other free-swimming many insects like termites have polymorphism as the larvae look different. Some protozoa member also show polymorphism like Trypanosoma.

282. What is the diameter of stenotypes ?

(a) 16 microns (b) 25 microns
(c) 10 microns (d) 5 microns

Rajasthan PMT-2000

Ans. (a) : The diameter of stenotypes is 16 microns.

283. Which one of the followig scientist coined the name Hydra ?

(a) Rudulphi (b) Hyman
(c) Linnaeus (d) Grobben

Rajasthan PMT-2000

Ans. (c) : Hydra name coined by Linnaeus.
Biologists are especially interested in hydra due to their regenerative ability.

284. Which of the following possess a hard exoskeleton formed by calcium carbonate?

(a) Physalia (b) Aurelia
(c) Corallium (d) Halistemma

AP EAMCET-2007

Ans. (c) : Corallium is a scientific name for precious coral or red coral that belongs to a genus of marine corals. They are found on rocky sea bottoms with low sedimentation and dark environment due to their skeletons made up of calcium carbonate.
Thus, coralium possess a hard exoskeleton formed by calcium carbonate.

285. Which of the following is not found in Hydra?

(a) Epithelio-muscular cells
(b) Cnidocyte
(c) Choanocyte
(d) Nerve cells

MGIMS Wardha-2004
UP CPMT-2004

Ans. (c) : Cnidocytes (cnidoblasts), nerve cells and epithelio – muscular cells are the characterstics feature of Hydra.
Cnidocytes, which are the stinging cells are used for anchorage, defense and for capture of prey.
Choanocytes is the main feature of phylum Porifera (sponges).

286. 'Ephyra' is the stage in the life cycle of :

(a) Physalia (b) Obelia
(c) Aurelia (d) Sea anemone

AFMC-2000

Ans. (c) : Ephyra is a free swimming larval stage in the life cycle of Aurelia or jelly fish.
In Aurelia the fertilized egg develops in to a Planula larva. The ephyra stage is a transient stage in the life cycle of Aurelia.

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287. Sea anemone belong to phylum :
(a) Protozoa (b) Porifera
(c) Coelenterata (d) Echinodermata
BCECE-2005

Ans. (c) : Corals, anemones and jellies are related and all belong to the phylum Cnidaria (Coelenterata). The animals in this group are aquatic, possess stinging cells within their tissue and have a body plan characterized by radial symmetry.

288. The relation between Zoochlorella and Hydra is known as:
(a) Endozoic (b) Parasitism
(c) Heterotroph (d) None of these
Rajasthan PMT-1996

Ans. (a) : Mutualism is a type of symbiotic relationship between a coloured hydra an zoochlorellae.
- Endozoic is a type of symbiosis is which one organism lives inside the body of another organism.
- Parasitism a type of symbiosis in which one organism benefits at the expense of the other organism.

289. Mesoglea of Hydra is chemically:
(a) Mucoprotein (b) Lipid
(c) Protein (d) Mucopolysaccharide
Rajasthan PMT-1996

Ans. (d) : Mesoglea lies between the Epidermis and gastrodermis and is a jelly-like substance that are composed of small dense granules of glycogen which is a polysaccharide and mucoprotein.
- Mesoglea serves as a skeleton to support the organisms and substratum for the cell attachment.

290. Main characteristics of Cnidaria is:
(a) Diploblastic,radial symmetry and cnidoblast cells
(b) Triploblastic, radial symmetry and cnidoblast cells
(c) Diploblastic, bilateral symmetry and cnidoblast cells
(d) Triploblastic, bilaterally symmetrical and cnidoblast cells
Rajasthan PMT-1996

Ans. (a) : Cnidarians appear to have diverse morphologies, but all members of this phylum universally possess stinging cells called Cnidoblasts.
- These are multicellular, diploblastic animals with tissue level of organization.
- There body is radially symmetrical.

291. Bud develops in an adult Hydra in
(a) 1-2 hrs (b) 3-4 hrs
(c) 12days (d) 2-4 days
Rajasthan PMT-1996

Ans. (d) : The bud enlarges, develops a mouth and circlet of tentacles at its free end. Once the bud is fully developed, it constricts as the base and finally separates the parent body to become individual organism. This process takes about 3 days to start and end.

292. Study the following cells of Hydra?
(1) nerve cells
(2) sensory cells
(3) nematocyst
(4) gastro dermal cells
(a) Only 2 (b) Only 1
(c) 1 and 2 (d) 3 and 4
Rajasthan PMT-1996

Ans. (d) : Hydra nematocysts are unique in storing energy for discharge in the capsule wall, which is elastically stretched by an extreme osmotic pressure.
- The gastrodermins lines the gastrovascular cavity in Hydra and is associated with the digestion.

293. Which of the following is known for its regeneration power?
(a) Hydra (b) Obelia
(c) Physalia (d) Aurelia
UP CPMT-2010

Ans. (a) : Regeneration can be referred to as the natural potential of some organisms to repair and regrow damaged or lost body parts. Some organisms may have the ability to grow into a complete organism even from a small fragment of the body, e.g. - Hydra and planaria.

294. Highest degree of polymorphism is found in
(a) Protozoa (b) Cnidaria
(c) Platyhelminthes (d) Arthropoda
Uttarakhand PMT-2009
J&K CET-2008

Ans. (b) : Polymorphism is a discontinuous genetic variation resulting in the occurrence of several different forms or types of individual among the members of a single species. It is the characteristic feature of cnidarians, particularly the polyp and medusa forms, or of zooids within colonial organisms. For ex- physalia.

295. Characteristic cells of Hydra are
(a) archaeocytes (b) thesocytes
(c) cnidoblasts (d) trophocytes
DUMET-2008

Ans. (c) : In Cnidaria, marine animals mainly contains cnidoblasts cells.
Example- Hydra, Jelly fish etc.
Cnidarians have cnidoblast cells on their tentacles and bodies. It is used for anchorage, defense, offense and capture of the prey.

296. Which of the following are totipotent cells in Hydra?
(a) Gi and cells (b) Nutrit epithelial
(c) Interstitial cells (d) Musculo epithelial
AFMC-2002

Ans. (c) : In hydra, the totipotent cells responsible for asexual reproduction (Budding) and tissue regeneration are known as interstitial cells. These cells have the remarkable ability to differentiate into any type of cells required for these process.

297. Siphonophora is the order in
(a) Protozoa (b) Cnidaria
(c) Porifera (d) Annelida
J&K CET-2009

Ans. (b) : Siphonophora is an order of cephalopods within class Hydrozoa, which is a class of marine organisms within the phylum Cnidaria.
- Siphonophores are highly polymorphic and complex organisms.
- Like other hydrozoans, some siphonophores emit light to attract and attack prey.

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298. In Hydra, waste material of food digestion and nitrogenous waste material are removed from
(a) mouth
(b) body wall
(c) mouth and body wall
(d) mouth and tentacles

BHU PMT (Screening)-2010

Ans. (c) : Hydra does not have any special excretory organ, they excrete via the general body surface by the process of diffusion. In hydra, undigested residues are effected from coelenteron through the mouth while nitrogenous excretory product (ammonia) is removed from the general body surface.
• Some nitrogenous waste products are also expelled out along with indigestible matter through the mouth.

299. Which of the following animals has a tetramorphic colony?
(a) Velella (b) Physalia
(c) Obelia (d) Porpita

MGIMS Wardha-2013

Ans. (b) : Physalia is tetramorphic in nature. A tetramorphic colony is a coloniat organism that consists of four types of zooids.
Physalia is a type of jellyfish. The four types of zooids in a physalia colony are–
• Gastrozooid – This is the feeding zooid.
• Dactylozooid – This is the defensive zooid.
• Gonozooid – This is the reproductive zooid.
• Gonopalpon – This is a non-reproductive zooid .

300. Gonads of Obelia occur in
(a) on blastocyst
(b) hydrula stage
(c) radial canals of medusa
(d) bases of tentacles of medusa

CMC Ludhiana-2008
AMU-2007

Ans. (c) : Gonads of Obelia occurs in radial canals of medusa which is type sexual reproduction of responsible for dispersion of sperm and ova in water.
• These gonads are responsible for dispersion of sperms and ova in water.

301. Which of the following belongs to Anthozoa?
(a) Dugesia (b) ster culiaceae
(c) Fungia (d) Aurelia

JIPMER-2001

Ans. (c) : The organism fungia are belong to Anthozoa. It is a class of cnidarians that included corals, sea pens and anemones.
The seabead, while their larvae can disperse as part of the planktoon.

302. If Hydra is cut transversely in three equal parts then :
(a) all three parts will die
(b) regeneration will occur in all the three parts
(c) regeneration will occur only in anterior
(d) regeneration occurs only in middle part

J&K CET-2006

Ans. (b) : Hydra has a high potential of regeneration. This was first established by Abraham Trembloy in 1744. If a living hydra is cut into two or three or more very small pieces, every piece develops into a new individual.

303. Which of the following has no skeleton?
(a) Star fish (b) Sponge
(c) Butterfly (d) jelly fish

JIPMER-1995

Ans. (d) : Jellyfish are the free-swimming marine members of the phylum Cnidaria. They live in marine waters. They do not have eyes, brains or skeletons.
• They have no hard bony parts but they do have the mesogloea.

304. Number of tentacles in Hydra is:
(a) two to four (b) six to ten
(c) ten to fourty (d) fourty of fifty

Haryana PMT-1999

Ans. (b) : Hydra belongs to the group Cnidaria.
• The animals have a sac-like and translucent body with one open end acting as mouth. The mouth is surrounded by arm-like structures called tentacles.
• The number of tentacles in hydra varies from 3 to 9.

305. Mesogloea is found in:
(a) Amoeba (b) Sponges
(c) Hydra (d) Earthworm

Haryana PMT-1999

Ans. (c) : Hydras are some of the simplest multicellular animals to have muscle.
• The body wall consist of two layers of cells with a middle gelatinous layer called mesoglea.
• In hydras and other two layered animals, one kind of cell serves as both muscle and epithelial cells.

306. The cnidoblasts used during looping movement of Hydra are:
(a) stenoteles (b) volvents
(c) desmosomes (d) atrichous isorrhiza

AP EAMCET-2000

Ans. (d) : Atrichous isorrhiza is a type of nematocyst present on the tentacles and helps hydra to locomote also known as inchmovement or somersaulting.
• In this method of locomotion of hydra usually the body first extends and then bends over, so that the tentacles attach to the substratum with the help of adhesive atrichous isorhiza.

307. Nematoblast of hydra are:
(a) Sensory
(b) Complicated
(c) With nematocyst apparatus
(d) All of the above

Rajasthan PMT-2006

Ans. (a) : Nematoblasts of cnidoblasts are sensory in nature. Cnidarian Animals are characterized with Cnidoblasts or cnidocytes present on the tentacles and the body. Cnidoblasts are used for anchorage, defense and for the capture of prey.

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• Cnidaria is classified in the kingdom animalia. They are mostly found in both marine and fresh water environment
Examle- Corals, sea anemones, Jellyfish, hydra etc.

308. Which type of reproduction is found in Hydra?
(a) Polyembryony (b) Sexual and asexual
(c) Parthenogenesis (d) Encystment
Rajasthan PMT-2000

Ans. (b) : Mainly Hydra reproduces asexually by the method of budding.
• During unfavorable conditions, hydra can also reproduce sexually.
A bud develops on hydra's body which further matures into a testicle or an ovary.

309. Hydra belongs to which of the following ?
(a) Bi radially symmetrical
(b) Radially symmetrical and coelomate
(c) Coelomate and bilaterally symmetrical
(d) Radially symmetrical and acoelomate
Rajasthan PMT-2000

Ans. (d) : Hydra is an aquatic animal belonging to phylum Cnidaria and class Hydrozoa. They are tubular, radially symmetrical with their mouth surrounded by tentacles present at the distal end. They are triploblastic and generally acoelomate.

310. Silver fish is a :
(a) fish (b) crustacean
(c) cnidarians (d) insect
BCECE-2002

Ans. (d) : Silverfish is an insect. It belongs to the hexapod invertebrates. They have a skeleton structure called "Chitinous Exoskeleton." It is a shiny silver insect.

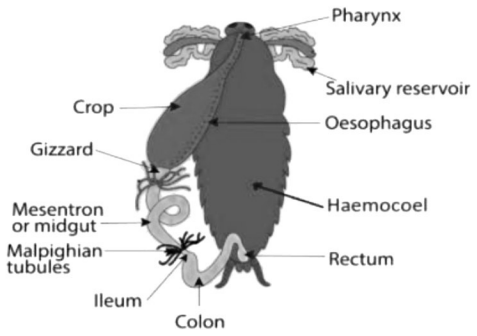
311. Corals are
(a) most rich fauna
(b) most poor fauna
(c) also found in fresh water
(d) free living ctenophorans
Haryana PMT-2011

Ans. (a) : Coral reefs are believed by many to have the highest biodiversity of any ecosystem on the planet- Even more than a tropical rainforest occupying less than one percent of ocean floor, coral reefs are home of more 25% of all marine life.

D. Ctenophora

312. Haemocoel is found in
(a) Hydra and Aurelia
(b) Taenia and Ascaris
(c) Cockroach and Pila
(d) Balanoglossus and Herdmania
BCECE-2014 / UP CPMT-2011
BVP-2007 / MGIMS Wardha-2006

Ans. (c): Haemocoel is the body cavity which is filled with blood or (haemolymph). It is generally found in arthropods and molluscs e.g. Periplaneta and Pila. These do not posses an arrangement of blood vesseles like those in mammals. Haemocoel develop from part of the blood system.



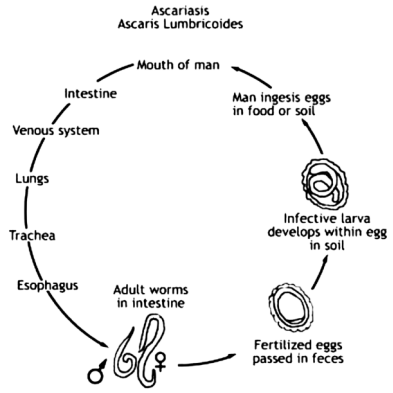
Structure of haemocoel in cockroach

313. Heart in fishes is described as
(a) Nurogenic and bronchial heart
(b) Myogenic, bronchial and venous heart
(c) Neurogenic and venous heart
(d) Neurogenic and alternate heart
AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The fish heart, like other vertebrates, is myogenic, possessing a pacemaker tissue that triggers action potentials slowly and spontaneously.
The heart in fishes is described as bronchial heart because its main function is to pump venous blood to ventral aorta into gills and to somatic vasculature.
• Fish heart is two chambered, consisting of an auricle and a ventricle. Fishes have venous type of heart.

314. Larvae of Ascaris undergo second moulting in
(a) Inside the egg
(b) Alveoli of lungs of man
(c) Intestine of man
(d) Inside the uterus of parent
TS EAMCET-31.07.2022 Shift-I

Ans. (b) : The larvae of Ascaris undergo second and third moulting occurs in the lungs.



• The larvae undergo first moulting in the soil.
• The second stage larva goes from soil to lungs.
• Larvae hatch from the eggs in your small intestine which is the first moult.

315. Function of comb plates of Ctenophores is
(a) Excretion (b) Locomotion
(c) Food collection (d) Respiration
TS EAMCET-09.08.2021 Shift-II

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Ans. (b) : Locomotion- In Ctenophore, there are special comb-like, eight ciliary plate which are found on their body, serve the purpose of locomotion.
In ctenophores- excretory and respiratory system are absent.
Food collection - A pair of long solid tentacles on which a special type of cell present called Lasso cells which helps in the catching of prey

316. Which of the following vertebrates are jawless
(a) Chondrichthyes (b) Osteichthyes
(c) Cyclostomata (d) Amphibia
TS EAMCET-12.05.2017

Ans. (c) : The jawless fish means the fish species which lack true jaw or defined jaw structure. These are lampreys and hagfish.
Cyclostomata which means round mouth fishes are a group of agnathans. They comprise jawless fishes that have tiorny epidermal structure resembling the function of teeth, unlike jawed fishes. These have bramenial gills positioned internally.
Chondrichthyes– Chondrichthyes are cartilaginous vertebrate fishes having defined jaw.
Osteienthyes– Osteienthyes is also known as bony fish
• Amphibia are also jawed.

317. Comb jelly is member of phylum
(a) Mollusca (b) Echinodermata
(c) Coelenterata (d) Ctenophora
MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (d) : The comb jelly, also known as ctenophore, is a member of the phylum Ctenophora. Ctenophores are marine invertebrates that are characterized by their comb-like rows of cilia, which they use for locomotion.

318. Which one of the following groups of animals reproduces only by sexual means?
(a) Ctenophora (b) Cnidaria
(c) Porifera (d) Protozoa
NEET (Karnataka)-2013

Ans. (a) : In Ctenophora asexual reproduction is absent. They are monoecious and fertilization is generally external.
• In Cnidaria asexual reproduction (budding) is found in the polyps and sexual reproduction is found in the medusa form.

319. 'Treponema pallidum' pathogen is a cause of
(a) leprosy (b) plague
(c) syphilis (d) pertussis
JIPMER-2016

Ans. (c) : Treponema pallidum, is the bacteria that cause syphilis.
leprosy- also caused by bacteria mycobacterium leprae
plague- also caused by bacteria yersinia pestis
pertussis- also caused by bacteria bordetella pertussis

320. Nematoblasts are formed by:
(a) interstitial cells
(b) gland cells
(c) myoepithelial cells
(d) nerve cells
Rajasthan PMT-2004

Ans. (a) : Nematoblasts are stinging cells found in cnidaria or coelenterata. The purpose is to ward off enemies or to capture prey.
Example– Hydra. The cells that produce nematocysts are called nematoblasts.

321. Comb plates are found in
(a) Adamsia (b) Aurelia
(c) Nereis (d) pleurobrachia
J&K CET-2008

Ans. (d) : Pleurobranchia belongs to sub phylum Ctenophora, in which comb plate are found. Ctenophora is exclusively marine group of animals, solitary free swimming.
Body is circular similar to medusa of coelentrates showing modified radial symmetry called biradial symmetry.

322. Which one shows bio-luminescence?
(a) Noctiluca (b) Polystomella
(c) Entamoeba (d) Suctoria
Haryana PMT-2005

Ans. (a) : Noctiluca shows bio– luminescence. These bioluminescent marine species include fish, bacteria, and jellies.
Noctiluca scintillans is a bioluminescent, dinoflagellate, which means it is a type of plankton that produces light.

323. In which type of egg, total cleavage is possible?
(a) Telolecithal
(b) Oligolecithal
(c) Centrolecithal
(d) Macrolecithal
BCECE-2011

Ans. (b) : Very little yolk in oligolecithal egg facilitates total holobastic cleavage.
• Complete furrowing (blastomeres completely separate from each other)- holoblastic eggs.
• Example - eggs of mammals, except for birds and lancetfish eggs.

324. Which of the following is/are grouped under phanerogams?
(a) Angiosperms
(b) Gymnosperms
(c) Pteridophytes
(d) Both (a) and (b)
UP CPMT-2008

Ans. (d) : Phanerogams are plant that bear seeds as well as flower compared to other plants. Spermatophytes are another term for these individuals. The plants body is divided into three parts - The root, the stem and leaves.

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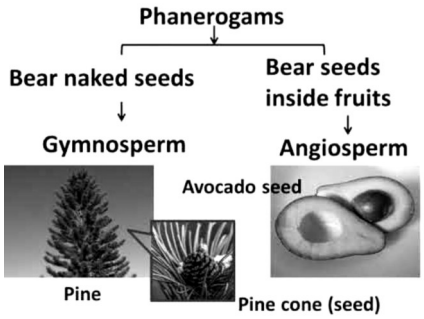


- Gymnosperms and angiosperms are categorized under phanerogams.
- They have well developed vascular system.
- The seeds are present without a seed coat in the gymnosperms (cycas, pinus) while the fully developed seed is present in angiosperm (Mango, pear etc).

325. The group of Anamniota includes
(a) reptiles and birds
(b) birds and mammals
(c) fishes and amphibians
(d) reptiles and mammals

UP CPMT-2008
Uttarakhand PMT-2008

Ans. (c) : Fishes and amphibians is known as anamniota because its lacks amnion which is the innermost layer of extraembryonic membrane that forms fluid filled sac around the foetus.

326. Animals having a built in thermostate to maintain constant body temperature are known as
(a) biothermic (b) poikilothermic
(c) oligothermic (d) homeothermic

UP CPMT-2008

Ans. (d) : Animals that have properties to maintain a constant environment inside the body is called homeothermic animals .
- Poikilothermic animals cannot maintain internal environment inside the body and changes according to its surrounding.
- Oligothermic - The ability to tolerate relatively low temperature.

327. When an animal has both sexes (male and female), it is called
(a) Intersex (b) Super male
(c) Gynandromorph (d) Super female

BCECE-2007

Ans. (c) : If an organism is half male and half female it is called gynandromorph.
Gynandromorphs are individuals that have both male and female characteristics. This phenomenon occurs in mitosis during early development. While the organism contains only a few cells, one of the dividing cells does not split its sex chromosome typically.
Gynandromorphs occurs in many organisms i.e. insects, spiders crustaceans, arthropods and also in birds.

328. Coelom in cockroach is:
(a) a spacious cavity
(b) absent
(c) enterocoelic
(d) restricted to gonads

AP EAMCET-2001

Ans. (d) : Coelom in cockroach is restricted to gonads. In Cockroach, the viscera and alimentary canal are present in haemocoel - a cavity filled with blood. The true coelom in Cockroaches is found in a much reduced state. It is formed by the splitting of mesodermal layer. It is exclusively present in the cavities of the gonad.
An cockroach, schizocoel coelom is presented which helps in the food digestion.

329. Eusthenopteron connects
(a) reptiles and birds
(b) birds and mammals
(c) fishes and amphibians
(d) amphibians and reptiles

CMC Vellore-2013

Ans. (c) : Eusthenopteron is connecting link between fishes and Amphibians.
Eusthenopteron was first discovered in miguasha, Quebec and was described by 'J.F. Whiteaves'.
- Eusthenopteron was a 'Devonian fossil' fish on the direct line towards the early amphibian
- It was an elongated, carnivorous fish characterized by advanced nature of vertebrate and strong notochord.

330. Body cavity of Hydra is called:
(a) haemocoel (b) coelenterons
(c) enterocoel (d) pseudocoel

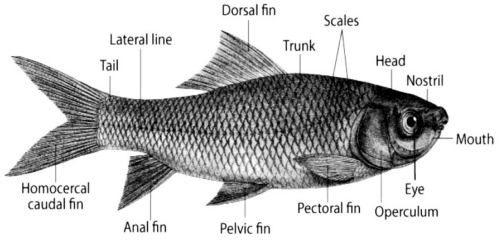
J&K CET-2003

Ans. (b) : Body cavity of hydra is called coelenterons, it is also known as gastrovascular cavity which takes the food and excretes the waste from the same opening.

331. The body of Rohu fish is covered by
(a) Cycloid scale, but the tail of homocercal
(b) Placoid scale, but the tail of heterocercal
(c) Cycloid scale, but the tail of heterocercal
(d) Ptecoid scale, but the tail is homocercal

WB JEE-2014

Ans. (a) : Rohu is a teleost fish and has a body covered with cycloid scale but the tail of homocercal. These scales have smooth outer margin and are uniform with the smooth texture. Grooves appear in the tail which are called homocercal.



Scales provide protection to the fish from predators and also helps in locomotion.

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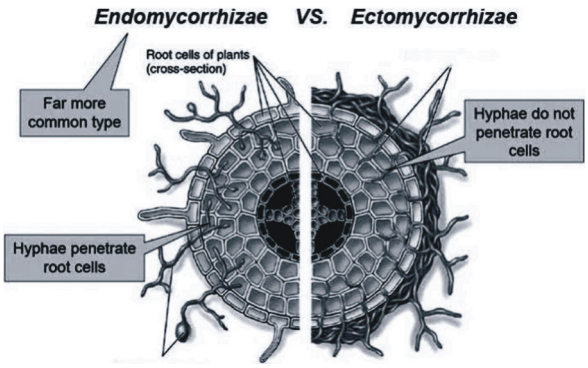
332. An example of endomycorrhiza is

(a) Rhizobium
(b) Nostoc
(c) Glomus
(d) Agaricus

AIPMT (Mains)-2010

Ans. (c) : The genus glomus form endomycorrhiza, a symbiotic associations with plants. The fungal symbiont in these associations absorbs phosphorus from soil and passes it to the plant. Plants having such associations show other benefits also, such as resistance to root-borne pathogens, tolerance to salinity and drought, and an overall increase in plant growth and development.



333. Choose the cat fish from the following:

(a) Labeo rohita
(b) Catla catla
(c) Cirrhina mrigala
(d) Wallago attu

Karnataka CET-2004

Ans. (d) : Wallago attu is a species of catfish that belongs to the family Siluridae. It is native to south and Southeast Asia. It is commonly known as helicopter catfish. It is found in Chilika Lake, Tonle Sap and also in large rivers.

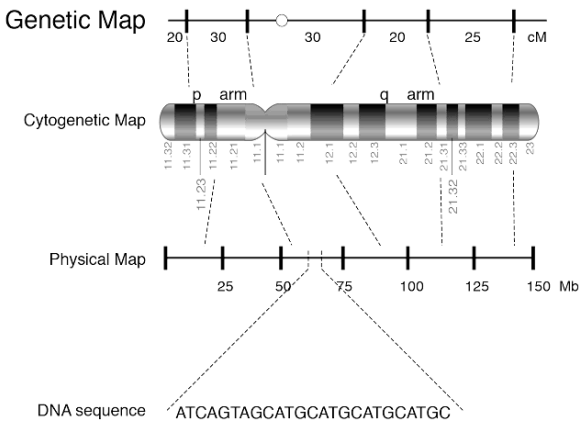
334. Genetic map is one that

(a) Shows the stages during the cell division
(b) Shows the distribution of various species in a region
(c) Establishes sites of the genes on a chromosome
(d) Establishes the various stages in gene evolution

MGIMS Wardha-2010

Ans. (c) : A genetic map (linkage map)shows the relative location of genetic markers (reflecting sites of genomic variants) on a chromosome.

- A genetic map is based on the concept of genetic linkage



- The closer two markers are to each other on a chromosome, the higher the probability that they will be inherited together.
- By studying inherited patterns, the relative order and location of genetic markers along a chromosome can be established.

Concluded, genetic map is one that stablishes sites of the genes on a chromosome.

335. Sea horse belongs to

(a) Mammals (b) Amphibia
(c) Aves (d) Pisces

UP CPMT-2003

Ans. (d) : Sea horse belongs to Division Gnathostomata and super class Pisces and class osteichthyes. Sea horse is also known as Hippocampus. Sea horse also possess a segmented bone shield, an erect stance, and a curly prehensile tail.

336. Which fish has an electric organ?

(a) Torpedo (b) Rhinoceros
(c) Scoliodon (d) Cat fish

Uttarakhand PMT-2007

Ans. (a) : Electric cell (genus Electrophorus), any of 3 species of elongated south American knife fishes that produce powerful electric shocks to stun prey, usually other fish.

- Torpedo is a marine cartilaginous fish which produces 8-220 volt electric charge (current) depending on species.
- Their electric organs are modified lateral muscle plate innervated by cranial nerves.

337. Isinglass is prepared from :

(a) lchthyophis (b) lungs
(c) fishes (d) lizards

AFMC -2011

Ans. (c) : Isinglass is a gelatinous substance produced from the high-grade collagen. This collagen protein is obtained from the air-bladder or swim bladder of certain fishes.

Example- perch, Indian salmon, catfishes, and carps etc. Isinglass is used in the preparation of special cement, in the clarification of wine and beer etc.

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E. Platyhelminthes

338. In which triploblastic animal, coelom is absent?
(a) Platyhelminthes (b) Aschelminthes
(c) Annelids (d) Arthropoda
APEAMCET-2021 / VMMC-2011
WB JEE-2011, 2008 / Uttarakhand-2005

Ans. (a) : The members of phylum Platyhelminthes are acoelomate and triploblastic i.e. lacking a body cavity. The special mesodermal tissue called mesenchyma fills the gaps between the organs.

339. Flame cells are present in:
(a) Aschelminthes (b) Platyhelminthes
(c) Annelida (d) Cephalochordata
JIPMER-2019/ AIIMS-2019
AMU-2008 /AIPMT-1991

Ans. (b) : The phylum Platyhelminthes contains flame cells. It is a specialized excretory cells that assist Playtehelminthes in excretion. Flame cells are also known as **solenocytes.**

340. Secondary host of Schistosoma is :
(a) Hydra (b) Euglena
(c) Snail (d) Pheretima
UP- CPMT -2012, 2008, 2003 / VMMC-2012
Punjab MET-2011 / BCECE-2010
DUMET-2005

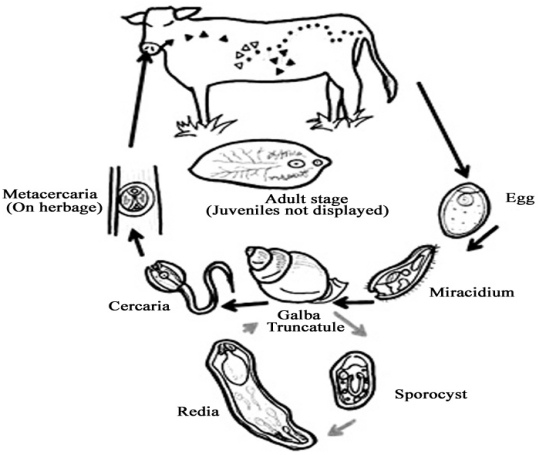
Ans. (c) : *Schistosoma* are parasitic flatworms. It is commonly as blood flukes. It is a digenetic parasite, and the life cycle of *Schistosoma* includes two hosts: the definitive host, which is human, and the secondary host, a snail.

341. Turbellarians are free living:
(a) Nematodes (b) Cestodes
(c) Planarians (d) Trematodes
UP CPMT-2012 / VMMC-2012
JIPMER-2009 / UP CPMT-2012, 2008
Rajasthan PMT-2008

Ans. (c) : One of the several flatworms in the Turbellaria traditional class is called **Planarias**. It mainly refers to free-living flatworms of the genus Tricladida (triclads), though a large variety of free-living Platyhelminthes are also known by this widely used name.

342. During the life-cycle, *Fasciola hepatica* (liver fluke) infects its intermediate host and primary host at the following larval stages respectively:
(a) redia and miracidium
(b) cercaria and redia
(c) metacercaria and cercaria
(d) miracidium and metacercaria
CMC Vellore-2014 / MGIMS Wardha-2010
AIIMS-2008 / AI PMT-2003

Ans. (d) : *Fasciola hepatica* is a digenetic endoparasite. It completes its life cycle with sheep and fresh water snail. Sheep serves as a primary host, and snails serve as an intermediate host. The shell of the snail is invaded by sporocyst formed when the egg capsule of the non-feeding larval miracidium comes into touch with water. As the sporocyst matures, redia emerges from the snail in the form of cercaria. They encyst and produce metacercaria.



343. What is true about Taenia saginata?
(a) Life history has pig as intermediate host
(b) There are two large suckers on scolex
(c) Rostellar hooks are absent
(d) Rostellum has double circle of hooks
AMU-2005 / UKPMT-2004
Manipal-2004 / AIPMT-1993

Ans. (c): *Taenia saginata* is a flatworm that is a member of the phylum Platyhelminthes. It is a parasite that lives in the human intestine and causes taeniasis and cysticercosis in cattle. The body consist of scolex, neck, and strobilia, while the scolex has four suckers, there are no hooks. An identifying feature of *Taenia saginata* is the absence of these rostellar hooks.

344. The alternate host of Taenia saginata is:
(a) cow (b) pig
(c) dog (d) none of these
BVP-2005 / AMU-2005
Haryana PMT-2004 / Manipal-2003

Ans. (a) : The alternate host of *Taenia saginata* is cow. *Taenia saginata,* also known as the beef tapeworm, is transmitted to humans in the form of infectious larva cysts found in the meat of cattle, which serve as the parasite's usual intermediate host. The other secondary host of *T. Saginata* are buffaloes, sheep and goats.

345. Flame cells present in the members of platyhelminthes are specialized to perform,
(a) Respiration and Osmoregulation
(b) Osmoregulation and Circulation
(c) Osmoregulation and Excretion
(d) Respiration and Excretion
Karnataka CET-20.05.2023

Ans. (c) : In platyhelminthes the main unit of excretion is flame cells. Which is scattered parenchymatous tissue if has numerous pseudopodial process. Its cytoplasm has a nucleus and other cytoplasmic organelles. The function of these cells is to regulate the osmotic pressure of the worm and maintain its ionic balance.

346. Identify the larval stages in the development of liver fluke
(a) Veliger, Trochophore, Sporocyst, Planula
(b) Sporocyst, Planula, Trochophore, Redia
(c) Miracidium, Sporocyst, Redia, Cercaria
(d) Planula, Sporocyst, Muller, Trochophore
AP EAPCET-23.05.2023, Shift-II

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Ans. (c) : Larval stages in the development of liver fluke–

Miracidium Larva– Its outer surface has 21 chitinous plate arranged in 5 rows. Outer surface is ciliated excluding anterior most apical end.

- A large number of germ cells are present which develops next larval form-sporocyst larva.
- Miracidium larva is more advanced than its adults due to the presence of locomotary cilia and sensory brain and eye.

Sprocyst Larva– It is inside the snail body. It is simplest larval form of fasciola. First larva in snail alimentary canal which comes out by breaking of outer wall of miracidium larva.

Redia Larva– Redia larva develop next larval stage. Cercarial form germ balls present inside their body.

Cercaria Larva– About 10-42 carcavia larva develops from single redia larva. Alimentary canal or gut becomes inverted U-shaped with mouth opening and muscular pharynx.

347. The larval stages of the parasite that causes gigantism in snail is

(a) Ascaris (b) Taenia solium
(c) Monocystis (d) Fasciola hepatica

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : Sporocyst larva of fasiciola cause gigantism in snails.

It is digenetic parasite, primary host is sheep and secondary host is snails. It is simplest larval form of fasciola.

348. Select the correct statements :

(A)Platyhelminthes are triploblastic pseudocoelomate and bilaterally symmetrical organisms

(B) Ctenophores reproduce only sexually and fertilization is external

(C) In tapeworm, fertilization is internal but sexes are not separate.

(D) Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.

(E) In sponges, fertilization is external and development is direct.

Choose the correct answer from the options given below :

(a) (A) and (E) only
(b) (B) and (D) only
(c) (A), (C) and (D) only
(d) (B), (C) and (D) only

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) :

- Ctenophores are free living marine organisms, and reproduce only sexually and fertilization is external.
- The tapeworms are flatworms that can live in a person's digestive tract. In tapeworm, fertilization is internal but sexes are not separate.
- Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.

349. Which of the following are found in Platyhelminthes?

(a) Colloblasts and comb plates
(b) Pseudocoelom and Renette cell
(c) Green glands and statocysts
(d) Ladder-like nervous system and flame cells

AP EAPCET-11.07.2022 Shift-I

Ans. (d) : The nervous system of Platyhelminthes is a complex even scattered system. It is longitudinal, meaning that there are two main nerve cords that run the length of the body. These nerve cords are interconnected by transverse nerves, which form a ladder-like pattern. The nerve cords are concentrated at the head region, they form a brain like structure called the **cerebral ganglia** that controls the sensory organ and motor responses. The flame cells are excretory organs that are found in all flatworms.

350. Assertion (A): Protonephridia are found in lancelet.

Reason (R): Protonephridia are primarily concerned with excretion.

The correct option among the following is:

(a) (A) is true. (R) is true and (R) is the correct explanation for (A)
(b) (A) is true. (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-II

Ans. (c) : Protonephridia are found in the phylum Platyhelminthes.

Bundle of flame cells are called protonephridia.

It is a network of dead-end tubules connected to an external opening. These tubules excrete dilute fluids and function in osmoregulation.

351. Match the following

	List-I		List-II
(i)	Larvae of Fasciola	(a)	Filariasis
(ii)	*Sacculina*	(b)	Female Anopheles Mosquito
(iii)	Plasmodium	(c)	Snail
(iv)	Wuchereria	(d)	Carcinus maenas

(a) (i – b), (ii – c), (iii – a), (iv – d)
(b) (i – a), (ii – c), (iii – d), (iv – b)
(c) (i – c), (ii – d), (iii – b), (iv – a)
(d) (i – d), (ii – c), (iii – a), (iv – b)

AP EAMCET-11.07.2022 Shift-II

Ans. (c) :

	List-I	List-II
(i)	Larvae of Fasciola	Snail
(ii)	Sacculina	Carcinus maenas
(iii)	Plasmodium	Female anopheles Mosquito
(iv)	Wuchereria	Filariasis

352. Alimentary canal is absent in _____

(a) Planaria (b) Liver fluke
(c) Blood fluke (d) Tapeworm

AP EAMCET-25.09.2020 Shift-I
Rajasthan PMT-1998

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Ans. (d) : Tapeworms belongs to the phylum Platyhelimthes. They can be either ectoparasites or endoparasites and very few of them are free living. Tapeworms have an incomplete alimentary canal and only one opening for ingestion and egestion as they absorb the host's digested food material.

353. Ascaris belongs to nematode and Taenia belongs to Platyhelminthis, but they exhibit which of the following as a common character?

(a) Sexes are separate (dioecious), i.e., males and females are distinct.
(b) Fertilization is internal and development is direct
(c) Bilaterally symmetrical and triploblastic
(d) Hooks and suckers are present

AP EAMCET-25.09.2020 Shift-I

Ans. (c) : Ascaris belongs to Aschelminthes, and Taenia belongs to Platyhelmenthes, but they exhibit bilaterally symmetrical and triplobalstic common characters.

354. Which of the following animal group are triploblastic, bilaterally symmetrical acoelomates?

(a) Arthropods, Molluscs and Poriferans
(b) Ctenophore, Nematodes and Echinodermats
(c) Chordata, Annelids and Platyhelminthes
(d) Only Platyhelminthes

AP EAMCET-24.09.2020 Shift-II

Ans. (d) : Flatworms (Platyhelminthes) are triploblastic, acoelomate, bilaterally symmetrical creatures with organ-level body organization. They may reproduce sexually and asexually, have a dorso-ventrally flattened body, and display a variety of parasitic morphologies.

355. Match the type of ring worm with the organ affected :

Column-I		Column -II	
A.	**Tinea corporis**	**p.**	**The groin**
B.	**Tinea capitis**	**q.**	**The scalp**
C.	**Tinea pedis**	**r.**	**The feet**
D.	**Tinea cruris**	**s.**	**Skin on the body**

(a) (A – s), (B – r), (C – q), (D – p)
(b) (A – p), (B – q), (C – r), (D – s)
(c) (A – s), (B – q), (C – r), (D – p)
(d) (A – q), (B – s), (C – r), (D – p)

AP EAMCET-25.09.2020 Shift-II

Ans. (c) :

Tinea corporis	–	Skin on the body
Tinea capitis	–	The scalp
Tinea pedis	–	The feet
Tinea cruris	–	The groin

356. Identify the correct statement with reference to platyhelminthes:

A. These are the first bilaterally symmetrical triploblastic animals.
B. They have pseudocoelom which acts like a hydrostatic skeleton
C. Hooks and suckers are present for attachment in parasitic forms
D. Fertilisation is internal, development is indirect with many larval stages

(a) A, B & C (b) A, B & D
(c) A, C & D (d) B, C & D

TS EAMCET-09.05.2019 Shift-I

Ans. (c) : Animals are divided into two categories based on their body plans' symmetry and the number of germ layers they include, named triploblastic and diploblastic, respectively.

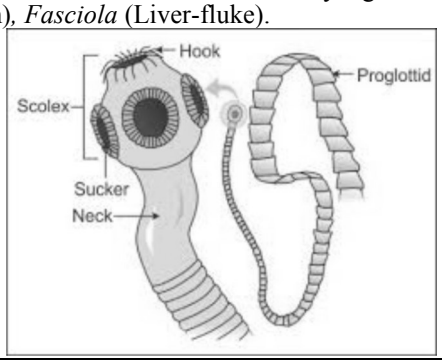
- The parasitic types of hooks and suckers include ones that take nutrients directly from the host via the surface of their bodies.
- The organization of the larva, also known as the nymph, is similar to that of the adult or imago.

357. Animal of which phylum have hooks and suckers and are endoparasite on other animals

(a) Platyhelminthes (b) Annelida
(c) Aschleminthes (d) Arthropoda

AIIMS-25.05.2019 Shift-I

Ans. (a) : Platyhelminthes or flatworm are mostly endoparasites found in animals. They contain hooks and sucker that allow them to directly receive nutrients from the host via the surface of their body. eg:- *Taenia* (Tape worm), *Fasciola* (Liver-fluke).



358. The following are found in Taenia solium, which one is the correct sequence?

(a) Oncosphere, hexacanth, cysticercus, matured proglottid, gravid.
(b) Matured proglottid, cysticercus, gravid, oncosphere, hexacanth.
(c) Hexacanth, cysticercus, gravid, oncosphere, mature proglottid.
(d) Gravid, oncosphere, cysticercus, hexacanth, mature proglottid.

AIIMS-2017

Ans. (a) : *Taenia solium* is a tapeworm. The life cycle of tapeworm having many larval stages are oncosphere, hexacanth, cysticercus, matured proglottid, and gravid. The infection of *Taenia* causes cysticercosis which is a disease of the intestine. It is caused by eating undercooked pork.

359. Which parasite shows alternation of generation and alternations of hosts in its life cycle?

(a) Fasciola (b) Ascaris
(c) Taenia (d) Wuchereria

AMU -2006 / BVP-2001

Ans. (a) : In *Fasciola* germ cells reproduce asexulally before the adult stage transitions to sexual reproduction. *Fasciola* completes its life cycle in two alternate hosts in a process known as "alternation of generation". The primary definitive host is sheep, and a freshwater snail serves as the secondary host.

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360. Bladder worm/cysticercus is the larval stage of
(a) tapeworm (b) roundworm
(c) pinworm (d) liver fluke
AIPMT-1991

Ans. (a) : The tapeworm larvae of the genus *Taenia* are scientifically known as Cysticercus. It is a tiny, sac-like vesicle with a bladder-like appearance. The consumption of food or water that has been contaminated with tapeworm larvae or eggs results in tapeworm infection.

361. The scientific name of lung fluke of man is
(a) Hymenolepis nana
(b) Schistosoma haematobium
(c) Paragonimus westermani
(d) Echinococcus granulosus
Uttarakhand PMT-2010
APEAMCET-2002

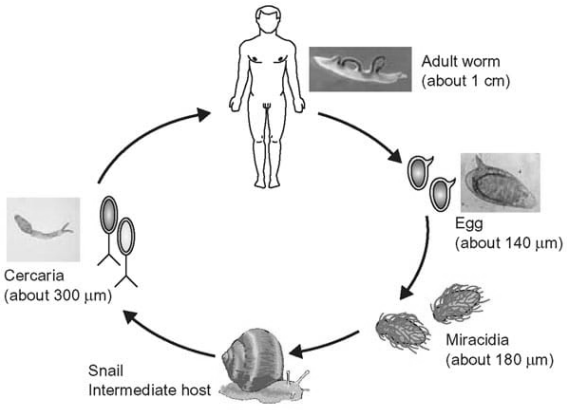
Ans. (c) : *Paragonimus westermani* which is the major species of lung flukes, infect the lungs of humans and causes **paragonimiasis**.
This infection comes from eating raw or lightly cooked crab, which carries immature flukes larvae.

362. Solenocytes are associated with:
(a) nutrition (b) respiration
(c) reproduction (d) excretion
MP PMT-2013

Ans. (d) : Solenocytes, commonly referred to as *flame cells*, are excretory organs found in Platyhelminthes. They are responsible for osmoregulation and excretion. Platyhelminthes are parasitic, commensal, or free-living organisms. They are a triploblastic worm that is bilaterally symmetrical and dorsoventrally flattened.

363. The larval from of Schistosoma that enters the snail:
(a) redia (b) cercaira
(c) miracidium (d) sporocyst
AP EAMCET-1998

Ans. (c) : The miracidium is the second stage in the life cycle of *Schistosoma*. When the eggs are laid and come into contact with fresh water, they hatch and release miracidiun. In this phase, miracidia are ciliated and free swimming.



364. Vitelline glands are found in :
(a) Fasciola (b) Taenia
(c) Pheretima (d) Ascaris
Manipal-2001

Ans. (a) : Vitelline glands are found in the fasciola. These cells are the major contributors to the formation of the eggshell. The vitelline cells are developed in the vitelline follicles which is located in the posterior third of an adult parasite body in the areas lateral to the uterus and testis.

365. Which one is not the larval stage of Fasciola ?
(a) Cercaria (b) Miracidium
(c) Cysticercus (d) Redia
Haryana PMT-2001

Ans. (c) : Cysticercus is not the larval stage of Fasciola. Cysticercosis is an infection caused by the larvae of the Parasite *Taenia solium*.
This infection occurs after a person swallows tapeworm eggs.
The larvae get into tissue such as muscle and the brain and form cysts (these are called cysticerci). Larval cysts in the brain cause a form of cysticercosis called neurocysticercosis, which can lead to seizures.

366. Tapeworm occurs as a parasite in:
(a) liver (b) stomach
(c) intestine (d) all of these
J&K CET-2001

Ans. (c) : *Taenia solium* (Tapeworm) is a digenetic parasite. The man is the primary host, and the pigs are secondary. The species of *Taenia* inhabit the gut (intestine) of man and domestic animals. It commonly infects many different animals, including humans, livestock, and domestic cats and dogs (usually meat-eating mammals).

367. What is common amongst Tapeworm, Liver fluke, and Planaria ?
(a) They are all segmented
(b) They are all found in gut
(c) They all have a coelom
(d) They are all have flattened bodies
Rajasthan PMT-2001

Ans. (d) : Tapeworm, liver fluke, and planaria belong to the phylum Platyheliminthes.
Dorso-ventrally flattened bodies are the most significant and common feature of all animals in this phylum Platyheliminthes. These organisms are acoelomates because their bodies are flat and lack a body cavity and their bodies are also not segmented.

368. The excretory cells, that are found in platy helminthes are:
(a) Protonephridia (b) Flame cells
(c) Solenocytes (d) All of the above
BCECE-2012
J&K CET-2007

Ans. (d) : The excretory cells, that are found in platy helminthes are Protonephridia, flame cells and Solenocytes. They are elongated, flagellated cells that aid in the removal of nitrogenous wastes in most lower invertebrates.
- They are responsible for excretion and osmoregulation in Platyhelminthes.
- Protonephridia is an excretory tube that lacks an internal opening. It is found in Platyhelminthes, Rotifers, and some Chordates.

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369. Find the wrongly matched pair

(a) Cnidoblast – Anchorage
(b) Flame cells – Defense
(c) Parapodia – Swimming
(d) Radula – Rasping organ
(e) Air bladder – Buoyancy

Kerala PMT-2013

Ans. (b) : Flame cells is a specialized excretory cells that assist Platyhelminthes in excretion and are not involved in defense.

370. Anus is absent in

(a) Unio (b) Pheretima
(c) Periplaneta (d) Fasciola

HP CET-2012

Ans. (d) : Anus is absent in *Fasciola.* The loose mesoderm known as parenchyma, which makes up the main tissue layer of flatworms, never separates into a cavity (coelom) in which internal organs are suspended.

371. Which one of the following animal has rhabdites ?

(a) Syllis (b) May fly
(c) tse-tse fly (d) Dugesia

Rajasthan PMT-2000

Ans. (d) : Many flukes, including *Dugesia*, have extracellular structures and specialized epidermal cells called rhabdites that help in locomotion.

• Rhabdites is a characteristic of turbellaria but also found in nemertea, gastrotricha and annelids.

372. Choose the correct combinations

	List-I	List-I	List-I
	Class	**Character**	**Example**
(I)	**Turbellaria**	**Mostly free living flat worms with mucus forming rhabdites in body wall**	**Convoluta**
(II)	**Trematoda**	**Commonly called flukes which bear two suckers**	**Bilharzia**
(III)	**Cestoda**	**Ecto and endoparasites body unsegmented**	**Echinococcus**
(IV)	**Phasmidia**	**Amphids performing chemo receptor function**	**Trichuris**

(a) (II) and (III) (b) (I) and (II)
(c) (I), (III) and (IV) (d) (I), (II) and (IV)

TS EAMCET-2015

Ans. (b) : Cestoda : They are long, flat, ribbon-like organism commonly known as **tapeworms**. The head, or scolex, has one or more hooked sucker, for attachment to the host.

• The body consists of segments called proglottids e.g. *Taenia*.

Phasmidia : They are one of two subgroups of nematodes used in some classification systems.
They are unicellular sensilla in the lateral tail region of certain species of nematodes.

373. The pair that exhibits hyperplasia and hypertrophy is:

(a) Fasciola hepatica — Plasmodium vivax
(b) Sacculina — Carcinus maenas
(c) Leishmania tropica — Wuchereria bancrofti
(d) Nosema notabilis—Sphaerospora polymorpha

TS EAMCET-15.05.2016

Ans. (a) :

- A parasitic trematode called ***Fasciola hepatica*** is sometimes referred to as the common **liver fluke or the sheep liver fluke**. The livers of many mammals, including humans, are affected by it. The epithelium of adult flukes in the bile ducts becomes inflamed and undergoes hyperplasia (an increase in cell number).
- A protozoan parasite called ***Plasmodium vivax*** is a human pathogen that causes malaria. Infections with ***P. vivax*** malaria can cause severe illness and mortality, frequently as a result of splenomegaly (hypertrophy) i.e. a increase in the spleen's size.

374. Which one of the following kinds of animals are triploblastic?

(a) Flatworms (b) Sponges
(c) Ctenophores (d) Corals

AIPMT (Screening)-2010

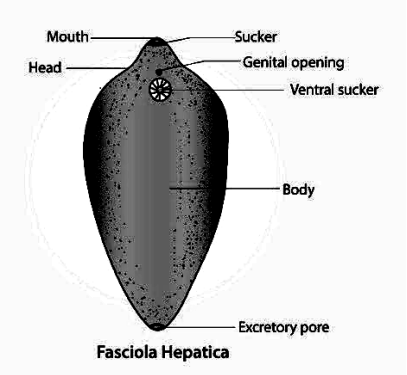
Ans. (a) : Flatworms belongs to phylum Platyhelminthes. It is an acoelomate animal.
Mesoderm, ectoderm, and endoderm are the three primary germinal cell layers that make up the whole body of the flatworms, they are referred to as triploblastic.

375. One example of animals having a single opening to the outside that serves both as mouth as well as anus is:

(a) Octopus (b) Asterias
(c) Ascidia (d) Fasciola

AIPMT (Screening)-2010

Ans. (d) :*Fasciola* belongs to phylum Platyhelminthes and have an incomplete alimentary canal, there is a single opening for ingestion and egestion both, as they absorb the host's digested food material.
This is also called as **blind sac body plan.**



Fasciola Hepatica

@apna_pdf

376. In which of the following organisms, self fertilization is seen?
(a) Earth worm (b) Liver fluke
(c) Fish (d) Round worm

Karnataka CET-2007

Ans. (b) : In liver fluke, self fertilization is occur in which male and female gametes are produced in the same individuals.

377. In contrast to annelids the platyhelminthes show
(a) radial symmetry
(b) presence of pseudocoel
(c) bilateral symmetry
(d) absence of body cavity

JIPMER-2007

Ans. (d) : Platyhelminthes does not have a coelomic or pseudocoelomic cavity for digestion of food as found in higher organisms. These groups of organisms are known to obtain their digested food directly.

378. The animal in which the space between the gut and the body wall is filled with mesenchyme is:
(a) Echinodiscus (b) Enterobius
(c) Eunice (d) Echinococcus

AP EAMCET-2008

Ans. (d) : *Echinococcus granulosus* parasitizes the intestines of dogs, wolves, foxes, cats, etc. The body wall consists of the tegument base membrane, integumentary muscle, and mesenchymal cells. Hence, mesenchymal tissue is present between the gut and body wall.

379. Which of the following requires an invertebrate intermediate host?
1. Dugesia
2. Schistosoma
3. Echinococcus
4. Ancylostoma
5. Wuchereria
(a) 3 and 4 (b) 2 and 5
(c) 3 and 5 (d) 1 and 4

AP EAMCET-2005

Ans. (b) : Schistosoma is a blood fluke of the class Trematoda of the phylum Platyhelminthes. It has a single intermediate host, a snail. It causes the disease schistosomiasis in humans. *Wuchereria bancrofti* is a nematode. It has mosquitoes like Ades, Culex, Anopheles, as the intermediate host, causes the disease, filariasis, or wucherireasis, in humans.

380. Match the following with reference to Taenia solium.

List I	List II
(A) Mehlis glands	(I) Tegument formation
(B) Vitelline gland	(II) Osmoregulation and excretion
(C) Mesenchyma cells	(III) Lubricate passage of capsules into uterus
(D) Flame cells	(IV) Secretion of embryophore
	(V) Capsule formation around zygote

The correct match

	(A)	(B)	(C)	(D)
(a)	(III)	(V)	(I)	(II)
(b)	(III)	(V)	(II)	(IV)
(c)	(V)	(I)	(II)	(IV)
(d)	(IV)	(III)	(I)	(II)

AP EAMCET-2013

Ans. (a) :

List I	List II
(A) Mehlis glands	(III) Lubricate passage of capsules into uterus
(B) Vitelline gland	(V) Capsule formation around zygote
(C) Mesenchyma cells	(I) Tegument formation
(D) Flame cells	(II) Osmoregulation and excretion

381. Mehlis gland in tapeworm is associated with
(a) respiration (b) reproduction
(c) excretion (d) circulation

VMMC-2014 / MGIMS Wardha-2013
APEAMCET-1999

Ans. (b) : The Mehlis gland is a part of the female reproductive organ and has an important role in guiding the ova out towards the passage ending in the uterus of flatworms. Thus, its secretion lubricates the passage of the uterus, through which the ova move. It may play a part in eggshell formation. Excretion in Platyhelminthes occurs through flame cells.

382. Cysticercus stage is formed in
(a) Taenia (b) Plasmodium
(c) Leishmania (d) Wuchereria

WB JEE-2010

Ans. (a) : A parasitic tissue illness known as cysticercosis is carried on by the larval cysts of the tapeworm *Taenia solium.* In most low-income nations, these larval cysts are a major contributor to adult-onset seizures by infecting the brain, muscles, or other tissues by ingesting eggs found in the feces of a person who has an intestinal tapeworm, one develops cysticercosis.

383. Which one of the following is an avtively swimming free-living and non – feeding stage of the liver – fluke?
(a) Sporocyst (b) Redia
(c) Cercaria (d) Metacercaria

AMU-2015

Ans. (c) : Cercaria larvae are present in the life cycle of liver fluke, which is a member of the Platyhelminthes. Cercaria is a free-swimming larva and has a long tail. It then leaves the snail and moves on to aquatic vegetation, where it forms a cyst called metacercariae.

384. Taenia solium derives its energy from the breakdown of
(a) nucleic acids (b) amino acids
(c) glycogen (d) glycerol

BVP-2008 / Uttarakhand PMT-2007
AP EAMCET-1998

@apna_pdf

Ans. (c) : The body of *Taenia solium* is divided into three parts: head (scolex), neck, and body. The anterior part of the scolex has 4 suckers and 28–32 hooks. The suckers are lateral in position, which helps in attachment to the intestinal wall. *Taenia solium* store energy mainly in the form of glycogen.

385. Flatworms excrete through:
(a) kidney (b) nephridia
(c) protonephridia (d) Malpighian tubules

Manipal-2012
AFMC-2002

Ans. (c) : Flatworms have a specialized excretory system called **protonephridia**, which helps them eliminate waste products from their bodies. Unlike more complex organisms with kidneys, flatworms use protonephridia to regulate their internal environment. These structures consists of tubules and flame cells that filter excess water and waste materials from the body fluids.

386. Taenia solium is associated with :
(a) Apolysis (b) strobilisation
(c) Premonition (d) All of these

Uttarakhand PMT-2004

Ans. (d) : *Taenia solium*, commonly called **pork tapeworm**, belongs to the family Taeniidae. It is transmitted to pigs through human feces, which have parasite eggs and contaminate their fodder. Apolysis in *Taenia solium* occurs at the posterior end of the strobila (proglottids). *Taenia solium* shows strobilation, which means adults in *Taenia solium* have a longer number of hermaphroditic sexual organs. Premonition means the host gets either complete or partial immunity when infected by *Taenia solium.*

387. Taenia solium belongs to class:
(a) Nematoda (b) Trematoda
(c) Cestoda (d) Turbellaria

VMMC-2010
JIPMER-1997

Ans. (c) : ***Taenia solium*** belongs to phylum Platyhelminthes and class Cestoda, order Cyclophyllidea and family Taeniidae.

388. Flame cells of flatworms help in
(i) Osmoregulation (ii) Digestion
(iii) Reproduction (iv) Excretion
(v) Bioluminescence
(a) ii only is correct (b) i and iv are correct
(c) iii only is correct (d) i and v are correct
(e) iv and v are correct

Kerala PMT-2015

Ans. (b) : The flame cell is a specialized excretory cell of the flatworm. The flame cell is structurally similar to the flame cells of the *Fasciola*. Bundles of flame cells are called *protonephridia*; these cells regulate osmotic pressure.

389. The trematode parasite infecting human lungs with two intermediate hosts in its life-cycle is:
(a) Schistosoma haematobium
(b) Paragonimus westermani
(c) Loa loa
(d) Mycobacterium tuberculosis

AP EAMCET-2003

Ans. (b) : The trematode parasite Paragonimas uses *Mycobacterium tuberculosis* as one of its intermediary hosts before infecting human lungs. The crab and snail serve as intermediate hosts. Trematodes are endoparasites and ectoparasites, and they are members of the phylum Platyhelminthes.

390. Infective stage to man of the parasite that causes haematuria is:
(a) miracidium (b) redia
(c) microfilaria (d) cercaria

AP EAMCET-2004

Ans. (d) : The parasite that causes hematuria in males, cercaria, is in its infectious stage. It is the parasitic trematode larva. From a single redia larva, cercaria larvae develop into the larval stage, with germ walls present inside their bodies in numbers between 10 and 12.

391. A statement of Assertion (A) is given followed by a corresponding statement of Reason (R) just below it. Of these statements, mark the correct answer as:
Assertion : Tapeworm, roundworm and pinworm are endoparasites of human intestine.
Reason : Improperly cooked food is the source in intestinal infections.
(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) If Assertion is true but Reason is false
(d) If both Assertion and Reason are false

Haryana PMT-2004

Ans. (b) : Roundworms and pinworms are members of the phylum Nematoda, class Cestoda, and tapeworm is a member of the phylum Plathyhelminthes. Endoparasites include roundworms, pinworms, and tapeworms. Inadequately prepared food is the primary cause of intestinal illness. However, eating incorrectly cooked food can cause tapeworm infection, contaminated food and water can spread roundworm, and insufficient sanitation can spread pinworm or ringworm.

392. Laurer's canal is characteristic feature of:
(a) Taenia (b) Fasciola
(c) Periplaneta (d) Ascaris

VMMC-2014

Ans. (b) : Laurer's canal is a characteristic feature of Fasciola. It is a part of the reproductive system of Trematodes, analogous to the vagina. These arise from the oviduct during the breeding season and act as fertilization tubes.

393. Which of the following does not have any alimentary canal ?
(a) Ascaris (b) Taenia
(c) Frog (d) Earthworm

JIPMER-2001

Ans. (b) : *Taenia solium* (Tapeworm) and *Echinococcus* (Dog Tapeworm) are endoparasites. They obtain their food from the host through the body's surface therefore, it lacks an alimentary canal. The alimentary canal is altogether absent in *Taenia solium.* Therefore, its mode of nutrition is saprozoic, i.e., it absorbs digested liquid food.

@apna_pdf

394. Hymenolepis nana is commonly known as:
(a) Pork tapeworm
(b) Dead man's finger
(c) Dog tapeworm
(d) Dwarf tapeworm

VMMC-2014 / AP EAMCET-2001

Ans. (d) : *Hymenolepis nana* is commonly called as **dwarf taperworm**. Its infection is most common in children, in persons living in institutional setting, and in people who live in areas where sanitation and personal hygiene is inadequate.

395. Schistosoma is a parasite found in:
(a) testes of frog (b) liver
(c) intestine (d) blood

BCECE-2006 / VMMC-2005 /AMU-2004

Ans. (d) : *Schistosoma* is a blood fluke that causes the parasitic disease Schistosomiasis in humans. It lives in the hepatic portal system and mesenteric blood vessels of human beings. The symptoms of Schistosomiasis are diarrhea, anemia, spleen, pain, and fever. *Taenia solium* is a parasite in the small intestine of humans that causes taeniasis.

396. Gynaecophoric canal is found in :
(a) Taenia saginata (male)
(b) Schistosoma haematobium (male)
(c) Wuchereria. bancrofti (male)
(d) E.granulosus (female)

DUMET-2001

Ans. (b) : A gynaecophoric canal is found in *Schistosoma haematobium*, which helps in lodging the female. The gynaecophore is a ventral groove or canal that fits the female worm and from where the latter resides. throughout adult life.

397. Respiratory, blood vascular and skeletal systems are absent in the members of phylum.
(a) Annelida (b) Porifera
(c) Platyhelminthes (d) Echinodermata

BVP-2015

Ans. (c) : Simple, bilaterally symmetrical flatworms make up the phylum Platyhelminthes. Unsegmented, triploblastic invertebrates. They lack specific circulatory and respiratory systems, they are forced to have flattened forms. They do have a digestive cavity, but it only has one aperture that can be used for ingestion and egestion.

398. Which one is not a larval stage of flatworm ?
(a) Redia (b) Cercaria
(c) Bipinnaria (d) Miracidium

VMMC-2008 / AMU-2008

Ans. (c) : The majority of starfish evolve into bipinnaria as their first stage of larval development. The bipinnaria is a free-living, aquatic zooplankton species. The bands of cilia are used for locomotion and eating.

399. An acoelomate with Protandrous condition is:
(a) Taenia (b) Schistosoma
(c) Megascolex (d) Ascaris

AP EAMCET-2000

Ans. (a) : Platyhelminthes, commonly known as flatworms, are invertebrate animals that are unsegmented and bilaterally symmetrical. Most flatworms are free-living and commonly found in freshwater. *Taenia* is a genus of tapeworms that belongs to the phylum Platyhelminthes. They are diagnosed with the protandrous condition. They are parasites.

400. In which of the following mosaic cleavage occurs ?
(a) Echinococcus granulosus (b) camel
(c) Whale (d) Dog fish

Rajasthan PMT-2000

Ans. (a) : *Echinococcus granulosus* is a protostome animals belonging to the phylum Platyhelminthes.
• Mosaic cleavage is also known as **determinate cleavage**. This is generally seen in the protostomes. The cells of blastocyst have a pre-decided fate, which means any cell of the blastocyst cannot develop into an individual animals.
• Each blastomere produced by early embryonic cleavage does not have the capacity to develop into a complete embryo.

401. Which of the following is not the character of Taenia solium?
(a) Apolysis (b) Proglottid
(c) Metamerism (d) Strobila

BCECE-2008

Ans. (c) : *Taenia solium* is a flatworm with proglottids, which are the several segments that make up its body. The scolex, the unsegmented neck, and the segmented posterior portion, often known as the *strobila*, are the three body regions.

F. Aschelminthes

402. Body cavity of adult ascaris is:
(a) haemocoel (b) amphicoel
(c) pseudocoelom (d) schizocoel

Rajasthan PMT-2009 / CMC Vellore-2009
Punjab MET-2009/ MGIMS Wardha-2004
UP CPMT-2004 / JIPMER-1995

Ans. (c) : A pseudocoelom is a fluid-filled body cavity that is not fully lined by mesoderm, unlike a true coelom. It is found in certain invertebrates like roundworms (nematodes) and rotifers. The pseudocoelom serves as a space for internal organ to provide nutrient, gases and waste products such as roundworm or nematodes.

403. Filariasis is caused by
(a) Wuchereria (b) Culex
(c) Trichinella (d) Schistosoma

MGIMS Wardha-2011 / BHU PMT Screening- 2011
AMU-2008 / Manipal-2005

Ans. (a) : Elephantiasis, also referred to as **lymphatic filariasis**, is a neglected tropical disease. When Culex mosquitoes transmit filarial parasites to people, infection results. Infection tends to come up in youth, where it does the lymphatic system covert harm. These thread-like filarial worms come in three different varieties. 90% of cases are caused by one *Wuchereria bancrofti*.

@apna_pdf

404. Read the following statements regarding Wuchereria bancrofti and find the correct ones

(A) Wuchereria exhibit sexual dimorphism
(B) It belongs to the class Phasmidia
(C) It is commonly called hook worm
(D) It is very common in tropical countries

(a) A & C (b) B & C
(c) A, B & D (d) B, C & D

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : Wuchereria bancrofti is commonly known as filarial worm. This worm causes filariasis in humans. It is pseudocoelomate, it shows sexual diamorphism, female is longer than male posterior end of the female is straight and bears anus. It is digenetic parasite requiring two host to complete its life cycle. The two host are man and female culex mosquito.

405. Assertion (A): - Female Wuchereria is ovoviviparous
Reason (R): - Larva of Wuchereria exhibits nocturnal periodicity

(a) A is correct but R is wrong
(b) A is wrong but R is correct
(c) Both A and R are correct and R is the correct explanation of A
(d) Both A and R are correct and R is not correct explanation of A

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : Female *Wuchereria* is ovoviviparous, and larvae exhibit nocturnal periodicity.
Nocturnal periodicity is circadian rhythm with an expression of periodicity, and at night parasite come to peripheral blood.
Wuchereria is a filarial nematode that is a major cause of lymphatic filariasis. It infect the lymphatic system and causes lymphatic filariasis.

406. Which of the following statements are correct in relation to Wuchereria?

(i) It is ovoviviparous
(ii) It completes its lifecycle in man and female Anopheles mosquito
(iii) Both male and female worms are found coiled together in the blood of man
(iv) Microfilaria larva is surrounded by a loose cuticular sheath
(v) Microfilaria larva moves to the peripheral blood circulation of man during the night time

(a) Only (i), (ii) and (iii) are correct
(b) Only (i), (iv) and (v) are correct
(c) Only (iii) and (v) are correct
(d) Except (i), all are correct

AP EAPCET-11.07.2022 Shift-I

Ans. (b) : Correct statement in relation to Wucheraria.
(i) It is ovoviviparous.
(iv) Microfilaria larva is surrounded by a loose cuticular sheath.
(v) Microfilaria larva moves to the peripheral blood circulation of man during the night time.

407. Which of the following is not correct related to Wuchereria?

(a) Its secondary host is female Anopheles mosquito
(b) It is commonly called filarial worm
(c) It is a digenetic parasite
(d) Pseudocoelmate

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Humans serves as a definitive host (sexual reproduction occurs), and mosquitoes (female Culex not female Anopheles), which serves as intermediate host.
It is commonly known as filarial worm. It is pseudo coelomate animal. It is a digenetic parasite, they complete their life cycle with two organism. The primary host is human and the intermidiate host is Culex mosquito. So, option (a) is not correct related to *Wuchereria*.

408. Assertion (A): Sexual dimorphism is distinct in Ascaris.
Reason (R): The post anal tail in male Ascaris is curved.
The correct option among the following is:

(a) (A) is true. (R) is true and (R) is the correct explanation for (A)
(b) (A) is true. (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-II

Ans. (a) : *Ascaris* belongs to the phylum Aschelminthes. It is also known as a **roundworm.** *Ascaris* is dioecious, i.e., male and female are distinct, and often female are longer than male.
It shows sexual dimorphism. The post anal tail in male *Ascaris* is curved.

409. Which one of the following is wrongly matched?

(a) Adamsia – Sea anemone
(b) Pennatula – Sea pen
(c) Gorgonia – Sea fan
(d) Ascaris – Hookworm

AP EAMCET-11.07.2022 Shift-II

Ans. (d) :
Adamsia – Sea anemone
Pennatula – Sea pen
Gorgonia – Sea fan
Ascaris – Roundworm
Ancylostoma – Hookworm

410. Larva of ascaris perform extra intestinal migration through the following organs in the body of man _____xc

1.	**Heart**	**6.**	**Pulmonary arteries**	**11.**	**Small intestine**
2.	**Liver**	**7.**	**Trachea**	**12.**	**Alveoli**
3.	**Lungs**	**8.**	**Larynx**	**13.**	**Bronchi**
4.	**Hepatic portal vein**	**9.**	**Oesophag-ous**	**14.**	**Glottis**
5.	**Post caval vein**	**10.**	**Stomach**	**15.**	**Pharynx**

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Options:

(a) 2 → 4 → 1 → 5 → 3 → 6 → 12 → 13 → 14 → 15 → 7 → 8 → 9 → 10 → 11

(b) 4 → 2 → 5 → 1 → 6 → 3 → 12 → 13 → 14 → 15 → 7 → 8 → 9 → 10 → 11

(c) 4 → 2 → 5 → 1 → 6 → 3 → 13 → 7 → 12 → 8 → 14 → 15 → 9 → 10 → 11

(d) 4 → 1 → 5 → 2 → 3 → 6 → 12 → 13 → 7 → 8 → 14 → 15 → 9 → 10 → 11

AP EAMCET-05.10.2021 Shift-I

Ans. (b) :

4 → 2 → 5 → 1 → 6 → 3 → 12 → 13 → 7 → 8 → 14 → 15 → 9 → 10 → 11

(4) Hepatic portal vein → (2) Liver → (5) Post caval vein → (1) Heart → (6) Pulmonary arteries → (3) Lungs → (12) Alveoli

(1) Heart → (13) Bronchi → (7) Trachea → (8) Larynx → (14) Glottis → (15) Pharynx → (9) Oesophagous → (10) Stomach → (11) Small intestine

411. Which of the following statements are wrong related to Nematoda?

(i) Body is covered by tough and protective collagenous cuticle

(ii) Excretory system consists of renette gland and ducts

(iii) Alimentary canal is incomplete

(iv) Sense organs like amphids and plasmids occur

(v) Sexes are not separate (Monoecious)

(a) (i) & (ii) only (b) (i) & (v) only

(c) (iii) & (v) only (d) (i), (iii) & (v) only

AP EAMCET-03.09.2021 Shift-II

Ans. (c) : The alimentary canal is complete with a well developed muscular pharynx. Sexes are separate in nematodes (dioecious). Females are longer than males. They are commonly called as **round worms.**

412. Match the following :

Nematode	Common name
(A) Ancylostoma	**(I) Filaria worm**
(B) Enterobius	**(II) Hook worm**
(C) Trichuris	**(III) Pin worm**
(D) Wuchereria	**(IV) Guinea worm**
	(V) Whip worm

The correct match is

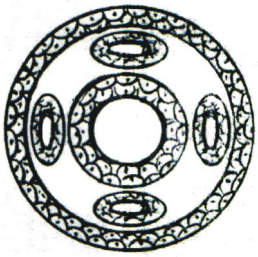
	A	B	C	D
(a)	II	IV	V	I
(b)	II	III	V	I
(c)	I	V	III	II
(d)	I	II	III	IV

TS EAMCET-29.09.2020 Shift-II

Ans. (b) :

	Nematode		Common name
(A)	Ancylostoma	(II)	Hook worm
(B)	Enterobius	(III)	Pin worm
(C)	Trichuris	(V)	Whip worm
(D)	Wuchereria	(I)	Filaria worm

413. Which of the following phyla possess body cavity as shown in the diagram below?



(a) Porifera (b) Coelenterata

(c) Annelida (d) Aschelminthes

Karnataka CET-2019

Ans. (d) : In pseudocoelomata, the body space is a **pseudocoelom or false coelom;** it is a persistent blastocoel enclosed between outer ectoderm and inner endoderm and not lined by mesoderm, e.g., Aschelminthes.

414. Wuchereria bancrofti causes____

(a) Servous cavity filariasis

(b) Lymphatic filariasis

(c) Subcutaneous filariasis

(d) Amoebiasis

MHT CET-2019

Ans. (b) : *Wuchereria bancrofti*, the causative agent of lymphatic filariais (LF) is transmitted by Culex mosquito.

415. Study the following statements regarding filarial worm:

(A) The inflammation in the lymph vessels is called lymphadenitis

(B) Swelling in the extremities of lymph, scrotum and mammary glands is called lymphoedema

(C) Sausage shaped larva undergoes three moulting and transforms into infective 3rd stage microfilaria

(D) 3rd stage microfilaria larva enters the blood vessels of man and undergoes the 3rd and 4th moulting to produce young filarial worm

From the above, identify the correct statement (s)

Options:

(a) B (b) B, C & D

(c) B & D (d) A, B, C& D

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : Swelling in the extremities of the lymph nodes, scrotum, and mammary gland is called lymphoedema, which is a correct statement regarding filarial worm.

Lymphadenitis is an infection of the lymph nodes by bacterial infection. It is a swelling due to buildup of lymph fluid in the body.

416. Coelozoic parasite with syncitial epidermis, pseudocoelom and rhabditiform larva during development.

(a) Taenia (b) Wuchereria

(c) Fasciola (d) Ascaris

AP EAMCET-24.04.2019 Shift-I

@apna_pdf

Ans. (d) : Coelozoic parasite with syncitial epidermis, pseudocoelom and rhabditiform larva are seen during the development of *Ascaris*. It belongs to phylum Aschelminthes. The body is covered by a thick cuticle, the epidermis is syncytial, and there are no cilia found in this phylum, which is one of the characteristics of the Phylum Aschelminthes.

417. Statement (S) : The eggs of Ascaris are described as 'mammillated eggs'

Reason (R) : These eggs are passed out with faecal matter and infect man via contaminated food and water

Which of the following is true?

(a) (S) is true, but (R) is false
(b) Both (S) an (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is false, but (R) is true
(d) Both (S) and (R) are true and (R) is the correct explanation of (S)

TS EAMCET-03.05.2018 Shift-I

Ans. (b) : Ascaris eggs are found in soil and human feces .The eggs of *Ascaris* are surrounded by a protein coat with a rippled surface; hence, the eggs are described as mammillated eggs.

They get into the body when someone eats or drinks something contaminated with the eggs. Most people with ascariasis get it by putting dirty hands in their mouth.

418. Study the following statements with regard to microfilaria larva

(I) Life span of microfilaria larva in man is about 70 days
(II) Sausage–shaped larva becomes infective larva within 10–20 hours
(III) Infective microfilaria attains sexual maturity within 5 to 18 months

Identify the correct statements of above

Options:

(a) I, III (b) I, II
(c) II, III (d) I, II, III

AP EAMCET-28.04.2017 Shift-II

Ans. (a) : Life span of microfilaria larva in man is about 70 days.

Infective microfilaria attains sexual maturity with in 5 to 18 months.

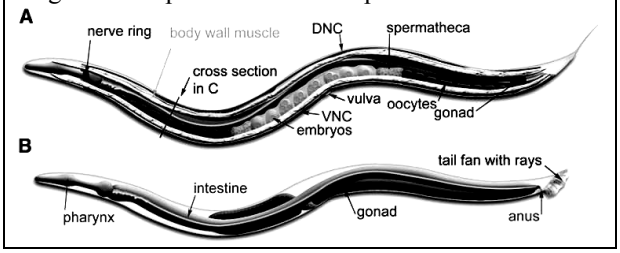
Both (I) and (III) are correct statement regarding to microfilaria larva.

419. The genome of Caenorhabditis elegans consists

(a) 3 billion bp (base pair) and 30000 genes
(b) 12 million bp and 6000 genes
(c) 4.7 million bp and 4000 genes
(d) 97 million dp and 18000 genes

CMC Vellore-2013

Ans. (d) : *Caenorhabiditis elegans* is small (less than 1 mm) nematode with 5 pairs of autosomes and 2 'X' chromosomes that often lives in soil. It has between 19 and 20,000 genes that code for proteins and approximately 100 million base pairs of DNA, making it a great example of the C-value paradox.



420. In the life cycle of Wuchereria, 3rd and 4th moults of microfilaria take place in

(a) lymph vessels of man
(b) stomach of mosquito
(c) salivary glands of mosquito
(d) thoracic muscles of mosquito

AP EAMCET-2013

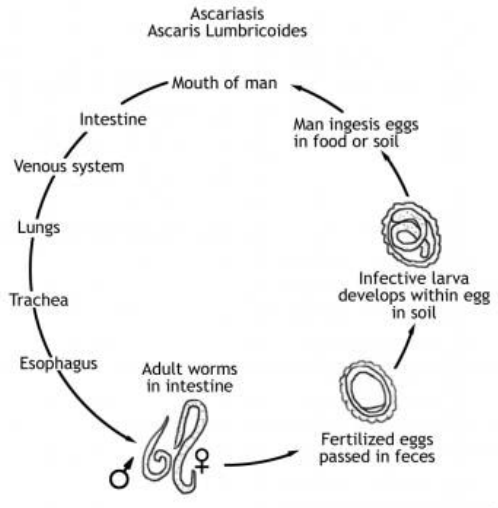
Ans. (a) : In the life cycle of Wuchereria, 3rd and 4th moults of microfilaria take place in lymph vessels of man. The microfilaria develop into first-stage larvae and subsequently into third stage and fourth moults infective larvae. The 3rd stage infective larvae migrate through the hemocoel to the mosquito's proboscis and infect another lymphatic system of man when the mosquito takes a blood meal.

421. In the life of cycle of Ascaris lumbricoides rhabditiform larva undergoes 2nd and 3rd moulting in

(a) Small intestine (b) Liver
(c) Heart (d) Alveoli of lungs

AP EAMCET-2014

Ans. (d) : Ascaris fertilized eggs are expelled from the host's body along with its feces into the soil, where the first larval moulting occurs. This larva lacks the ability to spread infection. By consuming contaminated food and drink, it develops into second stage larvae that infect the host. It passes through its second moulting in the alveoli of the lungs, producing the third stage larva.



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422. Infection of Ascaris usually occurs by:
(a) mosquito bite
(b) drinking water containing eggs of Ascaris
(c) eating imperfectly cooked pork
(d) Tse-tse fly

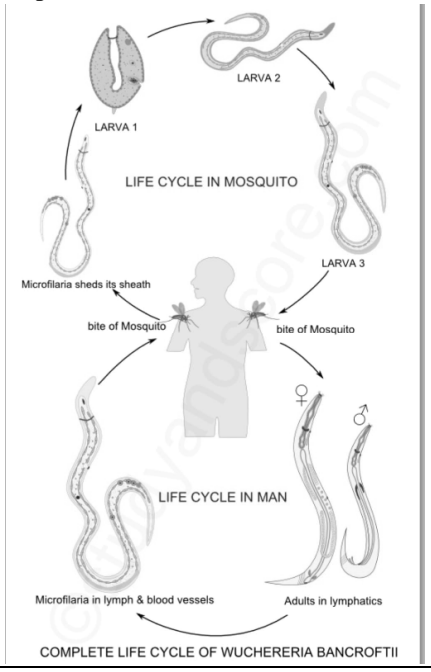
NEET-2013

Ans. (b) : Ascariasis is caused by the round worm, *Ascariasis lumbricoides*. It is an intestinal parasite. The eggs of the Ascaris are excreted along with the faeces of infected person, which contaminates soil, water, and plants etc.
A healthy person acquires infection through the consumption of water or food contaminated with the faecal matter of the infected person. Hence, the infection of Ascaris usually occurs by drinking water containing eggs of Ascaris.

423. The anterior V-spot in microfilaria of Wuchereria represents
(a) nerve ring
(b) cervical papilla
(c) excretory system
(d) reproductive system

WB JEE-2011

Ans. (c) : *Wuchereria bancrofti* also called as **filarial worm** belongs to phylum Aschelminthes.
- The primitive excretory system is represented by the anterior V-spot of *Wuchereria* microfilaria.
- The terminal portion of the alimentary canal is represented by the posterior V-spot, often known as the **tail spot.**



424. Wuchereria is found in:
(a) lymph nodes (b) lungs
(c) eye (d) gonads

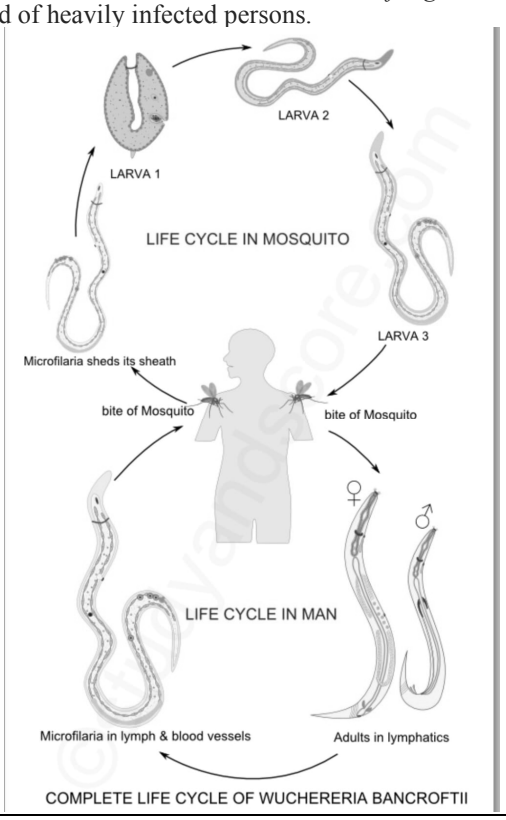
UP CPMT-2007
AIIMS-2002

Ans. (a) : *Wuchereria bancrofti* is a filarial worm found in the lymph nodes of humans, causing a lymphatic filariasis called **Bancroft's filariasis**. They are primarily found in the afferent lymphatic channels of the lower body's lymph glands. Many mosquito species act as a vector for the transmission of *Wuchereria*.

425. Wuchereria bancrofti is transmitted by:
(a) sandfly
(b) tse-tse fly
(c) Anopheles mosquito
(d) Culex mosquito

BVP-2010

Ans. (d) : *Wuchereria bancrofti* is a parasite that infects the lymphatic glands and vessels of humans, and its embryo *Microfilaria bancrofti*, appears in the peripheral blood at night.
Manson (1877–79), who discovered this peculiar periodicity, presumed therefore that infections with this parasite are brought about through the intermediary of blood-sucking insects, which are active at night. On account of the habits of mosquitoes, it directed his attention to the relationship of these insects to the transmission of filariasis and fed *Culex fatigans* on the blood of heavily infected persons.



426. Which one has no intermediate host?
(a) Taenia (b) Ascaris
(c) Fasciola (d) Plasmodium

JIPMER-2005

Ans. (b) : *Ascaris lumbricoides* has no intermediate host. *Ascaris* is a human intestinal worm. The intermediate host in the case of liver fluke is a mud snail. *Ascaris* life cycle occurs in a single host. The intermediate host in the case of tapeworm may be fish, pork, beef, etc.

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427. Ascaris larva is called:
(a) cysticercus (b) rhabditiform
(c) hexacanth (d) oncosphere
VMMC-2008 / AMU-2008
AIPMT-1992

Ans. (b) : Nematodes (roundworms) are characterized by their rhabditiform larvae. Ascaris is monogenetic since it only has one host, a man, where infection takes place directly. The first larva, also known as the rhabditform larva, forms 10-14 days after cleavage and is not an infectious stage.

428. The embryonated egg of Ascaris represents:
(a) an egg with blastula
(b) an egg with a juvenile
(c) an egg with an egg
(d) an egg with gastrula
VMMC-2013 / Haryana PMT-2000
AIPMT-1997

Ans. (b) : The *Ascaris* embryonated egg is a juvenile-containing egg. The term "embryonated egg" refers to the *Ascaris* eggs that contain the second stage of the juvenile. They can spread infection to a human host. These eggs may survive for 5 to 6 years in the soil under the right temperature and moisture conditions.

429. Rhabditiform larva performs extra intestinal migration through different organs in the body of man. Arrange them in the correct sequence
(A) Liver **(B) Hepatic portal vein**
(C) Heart **(D) Post caval vein**
(E) Lungs **(F) Pulmonary**
(G) Alveoli **(H) Intestine**
(a) D-A-B-E-F-C-H-G (b) B-A-D-C-F-E-G-H
(c) E-F-A-C-B-D-G-H (d) A-B-D-F-C-G-E-H
AP EAMCET-2016

Ans. (b) : The rhabditiform larva enters the body through the skin and travels through the blood stream to the liver. From the liver it travels to the post caval vein, hearts, lungs, and then to the alveoli. The larva then hatches in the alveoli and makes its way to the intestine, where it matures into an adult worm.
The correct sequence of Rhabditiform larvae movement are–
Hepatic portal vein → Liver → Post caval vein → Heart → Pulmonary arteries → Lungs → Alveoli → Intestine.

430. Flooding of the field controls:
(a) Fungi (b) Bacteria
(c) Viruses (d) Nematode
BCECE-2015

Ans. (d) : Nematodes are small, worm-like organisms that can be found in soil, water, and plants. They can be harmful to plants, causing disease such as root-knot nematode and cyst nematode. Flooding fields can be effective method to control nematodes by reducing their population through oxygen deprivation. It helps in managing nematode related disease in plants.

431. Which one is also called Hookworm?
(a) Ancylostoma (b) Enterobius
(c) Rhabditis (d) Ascaris
BCECE-2015

Ans. (a) : *Ancylostoma duodenale* is also known as **hookworm**. It belongs to the phylum Nematoda and has a flexure at its frontal end, giving it an S-shaped worm.

432. Which of the following is not correctly matched?
(a) Sycon → Canal system
(b) Star fish → Radial symmetry
(c) Ascaris → Flame cell
(d) Prawn → Haemocoel
WB JEE-2011

Ans. (c) : Option (c) is not correctly matched because flame cells are present in the phylum Platyhelminthes (flatworms). Flame cells are the specialized excretory cells that help in excretion in animals. In Ascaris, the excretory system consists of one or two large renette gland cells.

433. Pseudocoelomic organism belongs to:
(a) Arthropoda (b) Annelida
(c) Mollusca (d) Aschelminthes
BCECE-2012 / DUMET-2006

Ans. (d) : Pseudocoelom is a form of coelom that differs from actual coelomates in that it is not obtained from mesoderm. It is seen in Aschelminthes or Nematoda phylum organism.
Example:- *Ascaris.*

434. Which one of the following is the infective stage of Ascaris lumbricoides?
(a) Unsegmented egg
(b) Egg with first stage larvae
(c) Egg with second stage larvae
(d) Free third stage larvae
(e) None of the above
CMC Vellore-2015

Ans. (c) : Egg with second stage larvae is the infective stage of *Ascaris lumbricoides*.
The first stage larvae is formed 10-14 days after cleavage and is called *rhabditiform larva* and it is non infectious. In another week it molts to become the second stage larvae which is capable of infection in the host.

435. Pin-worm is:
(a) Ancylostoma (b) Necater
(c) Wuchereria (d) Enterobius
MP PMT-2013 / Punjab MET-2004
AP EAMCET-1998

Ans. (d) : *Enterobius vermicularis* is a parasitic worm known as **pinworm or thread worm** is generally found in human intestines and sometimes lives in the colon and rectum of humans. It is belongs to phylum Aschelminthes or Nematoda.

436. Number of moulds, a larva of Ascaris undergoes to become an adult, is:
(a) one (b) two
(c) four (d) eight
AP EAMCET-2000 / AP EAMCET-1998

Ans. (c) : Ascaris is a monogenetic parasite affecting humans. It causes a disease called **ascariasis.** It undergoes four moult to become an adult. *Ascaris lumbricodes* is the 'large round worm' of humans, and it grows up to the length of 35 cm.

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437. Posterior end of male Ancylostoma has:
(a) anus (b) curved tail
(c) bursa (d) caudal spine
BVP-2008
Uttarakhand PMT-2007
AP EAMCET-1998

Ans. (c) : The copulatory bursa, which encloses the cloaca, is the large, umbrella-like structure that makes up the posterior end of the male Ancylostoma. The bursa facllitates copulation. Bursa have bursal rays which are of taxonomic importance.

438. Caudal sensory organs (Phasmids) are present in
(a) rotifers (b) nematomorphs
(c) nematodes (d) cestodes
Punjab MET-2011

Ans. (c) : Caudal sensory organs (Phasmids) are present in nematodes. Phasmids are found in the posterior part of male and female nematodes. Phasmid neurons are located in the tail. Additionally, Phasmids neurons are involved in controlling chemorepulsion behaviour.

439. Purgative to expel Ascaris is
(a) oil of Chenopodium (b) tetrachlorethylene
(c) hexylresorcinol (d) all of the above
Punjab MET-2011

Ans. (a) : Purgatives are drugs that cause more frequent bowel movements and looser feces. Some medications, such as oil of chenopodium, are used to treat Ascariasis. The annual blooming plant genus *Chenopodium* is significant in medicine. Chenopodium oil is the name given to the oil obtained from this plant, and every active antihelminthic.

440. In Ascaris, the coelom is:
(a) schizocoelom (b) pseudocoelom
(c) true coelom (d) haemocoelom
UP CPMT-2012
Rajasthan PMT-2008
CG PMT-2008

Ans. (b) : In the phylum Aschelminthes, pseudocoelom is observed. *Ascaris* is a member of the phylum Aschelminthes, which shows the presence of pseudo-coelom. The fluid-filled body cavity present found between the mesoderm and the endoderm called the pseudocoelom.
Pseudocoelom is also known as a **false coelom.**

441. Respiration in Ascaris is :
(a) aerobic respiration
(b) anaerobic respiration
(c) both 'a' and 'b'
(d) none of these
MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (c) : Ascaris breathes anaerobically, because the hosts gut does not have enough oxygen. In this procedure, glycogen travels through glycolysis to produce energy, CO_2 and fatty acids.
If there is a free oxygen present in the host intestine, it appears that aerobic respiration also takes place.

442. One of the following is not a nematode parasite?
(a) Trichinella (b) Ascaris
(c) Dracunculus (d) Schistosoma
Haryana PMT-2001

Ans. (d) : *Schistosoma* is not a nematode parasite, commonly known as **blood flukes,** belongs to the phylum Platyhelminthes.
Disease caused by *Schistosoma* are called as schistosomiasis, also known as **bilharzia or snail fever.**

443. Match the following:

(A) Entamoeba histolytica	**(I) Cytozoic parasite**
(B) Plasmodium	**(II) Coelozoic parasite**
(C) Wuchereria	**(III) Rhabditiform larva**
(D) Extra intestinal migration	**(IV) Monogenic parasite**
	(V) Lymphadenitis

	A	B	C	D
(a)	(IV)	(II)	(I)	(III)
(b)	(IV)	(I)	(V)	(III)
(c)	(IV)	(I)	(II)	(III)
(d)	(IV)	(II)	(V)	(I)

AP EAMCET-2015

Ans. (b) :

(A)	Entamoeba histolytica	(IV)	Monogenic parasite
(B)	Plasmodium	(I)	Cytozoic parasite
(C)	Wuchereria	(V)	Lymphadenitis
(D)	Extra intestinal migration	(III)	Rhabditiform larva

444. Thigmotaxis is not shown by:
(a) Paramecium (b) Amoeba
(c) Ascaris (d) Hydra
BCECE-2010
JIPMER-2009
UP CPMT-2008

Ans. (c) : Thigmotaxis is not shown by *Ascaris*. It is a phenomenon of touch, that there will be stimulus in the organism, when touches a rock or a sand or anything.

445. Which one of the following is first nematode parasite to be discovered ?
(a) Entrobius vermicularis
(b) Amcylostoma duodenale
(c) Ascaris lumbicoldes
(d) Dracunculus medinensis
Rajasthan PMT-2000

Ans. (d) : Roundworms are also known as **Nematodes** belongs to of the phylum Nematoda, and more than half of the species that have been found are parasites of humans, animals, and even plants.
Early Egyptian physicians between 1553 and 1550 BC noted the existence of the Guinea worm. *Dracunculus medinensis*, which was later identified by a German Egyptologist in 1820. This huge, thin, and thread-like nematode can grow up to 1 meter long.

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446. Which one of the following statements about certain given animals is correct –
(a) Round worms (Aschelminthes) are pseudocoelomates
(b) Molluces are acoelomates
(c) Insects are pseudocoelomates
(d) Flatworms (Platyhelminthes) are coelomates

AIPMT (Screening)-2010

Ans. (a) : Round worms (Aschelminthes) are pseudocoelomate whereas, Flatworms are acoelomate, and Mollusca and Insects are coelomate.

447. Which one of the following groups of animals is bilaterally symmetrical and triploblastic ?
(a) Sponges
(b) Coelentrates (Cnidarians)
(c) Aschelminthes (round worms)
(d) Ctenophores

AIPMT-2009

Ans. (c) : Aschelminthes is a superphylum consisting of psuedocoelomates. They are commonly known as **round worms** and are characterized by the presence of a psuedocoelome. Aschelminthes are bilaterally symmetrical and triploblastic.

448. A triploblastic pseudocoelomate, bilaterally symmetrical human parasite which is oviparous and the transmission is by contact. It is :
(a) filarial worm (b) hook worm
(c) palalo worm (d) tape worm

AP EAMCET-2006

Ans. (b) : Hook worm (Ancylostoma) belongs to phylum Nematode or Aschelminthes are bilaterally symmetrical, triploblastic, and pseudocoelomate animals. It is a human parasite, female are oviparous and the transmission is by contact.

449. From the following a monogenetic parasite is:
(a) Taenia solium (b) Ascaris
(c) Fasciola hepatica (d) Plasmodium vivax

AP EAMCET-2008

Ans. (b) : Monogenetic parasites are the parasites that complete their life cycles in one host only. *Ascaris* is a monogenetic parasite as it completes its life cycle in a single host (human).

450. *Ascaris* is characterized by :
(a) presence of true coelom but absence of metamerism
(b) presence of true coelom and metamerism (metamerisation)
(c) absence of true coelom but presence of metamerism
(d) presence of neither true coelom nor metamerism

Rajasthan PMT-2010
AIPMT-2008

Ans. (d) : Ascaris belongs to the phylum Aschelminthes phylum. It has a pseudocoelom instead of a true coelom, and it body is also not segmented metamerically.

451. Choose the correct statement with reference to Ascaris
(a) Hatching of embryos takes place in the stomach due to lytic enzyme
(b) Adulthood is reached inside the body of the host in ten days time
(c) Development and moulting takes place in the alveoli of lungs
(d) Hatching of embryos takes place within ten hours

UP CPMT-2004

Ans. (c) : Ascaris is a genus of parasitic nematode worms. It is a monogenetic parasite infecting humans and causes the disease called **ascariasis**.
Moulting is a feature of nematodes that allows growth. Usually, four moults occur during its life cycle. The larvae undergo their first moulting in the soil. Then the larvae undergo second and third moultings in the lungs. Then, the fourth moulting occurs in the intestine.

452. Ascaris is:
(a) a parasite
(b) a autotroph
(c) facultative autotroph
(d) facultative heterotrophy

Rajasthan PMT-2004

Ans. (a) : *Ascariasis* is caused by the round worm, *Ascariasis Lumbricoides*. It is an intestinal parasite. The eggs of the *Ascaris* are excreted along with the faeces of infected person, which contaminates soil, water, and plants etc.

453. In Ascaris, eggs are fertilised in the:
(a) Vagina (b) Oviducts
(c) Lower part of uteri (d) Seminal vesicles

BVP-2010

Ans. (c) : In Ascaris, eggs are fertilized the lower part of uteri. The larva matures in alveoli and again migrates to the intestine where it develops into the adult.

454. The infection of Enterobius is caused to man by:
(a) flying (b) piercing
(c) inoculation (d) contamination

UP CPMT-2001

Ans. (d) : *Enterobius* is commonly called **pinworm** which infect the human intestine. It is also called **enterobiasis.** They are small round worms, whitish in colour and named because of their unique tapering shape with a pointed tail. It is a parasite worm which infects the humans and are transmitted by the direct contact with the contaminated surface with pinworm eggs.

455. In which group of animals blastocoels is persistent as body cavity in adult?
(a) Arthropoda (b) Nemathelminthes
(c) Mollusca (d) Annelida

AP EAMCET-2004, 2001

Ans. (b) Nemathelminthes is the group of animals in which blastocoel is persistent as body cavity in adult. Phylum Nemathelminthes comprises of animals commonly called **nematodes or round worms.** The body cavity of nematodes is a persistent blastocoel, called pseudocoel as it is not lined by coelomic epithelium. It is bound on the outer side by muscles while by cuticle on the inner side. It contains a fluid rich in proteins and also contains a few phagocytic cells which help in defense of the body.

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456. What is the length of female Ascaris lumbricoides ?
(a) 200-350 mm (b) 150-320 mm
(c) 100-150 mm (d) 50-80 mm
Rajasthan PMT-2000

Ans. (a) : Females have straight tails that measure 20 to 35 cm (200-350mm) in length. The tails of males tend to be curled and they are smaller (15–31 cm) than female.

457. Muscle cells of Ascaris are arranged in :
(a) coclomyarian (b) platymydrian
(c) polymyarian (d) holomyarian
Rajasthan PMT-2000

Ans. (b) : Muscle cells of Ascaris are arranged in Platymydrian pattern. It is the most common arrangement and may be the basic type from which more complex arrangements have evolved. The muscle cells are divided into dorsal and ventral fields by the lateral hypodermal cords and further into four by the dorsal and ventral hypodermal cords. This division into functional fields is important in determining the pattern of nematode locomotion.

458. Which one of the following is holotype ?
(a) Oesophagostomum apiostomum
(b) Oesophagostomum columbianum
(c) Oesophagostomum radiatum
(d) Oesophagostomum venulosm
Rajasthan PMT-2000

Ans. (b) : Nodule worms, also known as *Oesophagostomum columbinum,* are parasites of the large intestine of sheep, goats, and certain wild antelopes. They are roundworms belong to the Strongylidae family and are frequently known as "nodules" or "nodular worms". They primarily cause nodular worm disease, also known as **oesophostomiasis,** by infecting the large intestine and occasisonally the distal small intestine.
• Holotype means a single type specimen upon which the description and name of a new species is based.

459. The thin layer of epidermis having scattered nuclei and no partition walls below the cuticle of Ascaris is known as:
(a) multinucleated epidermis
(b) aseptate
(c) coenocytic epidermis
(d) syncytial epidermis
CMC Ludhiana-2011

Ans. (d) : Ascaris has the syncytial epidemis which is made up of an peripheral layer of continuous cytoplasm with distributed nuclei that is joined to the cell bodies below by the tiny cytoplasmic bridge. In animals, the multinucleated state is known as **syncytial.**

460. Amphids are cuticular elevations on ventrolateral lips of Ascaris, these are:
(a) Tangoreceptors (b) Tactoreceptors
(c) Olfactoreceptors (d) Chemoreceptors
CMC Ludhiana-2008

Ans. (d) : Amphids are olfatory chemoreceptors that help in olfactory sensibility or the sense of smell and are located on the lower lips of Nematodes like *Ascaris.*
• Amphids are the primary olfactory and chemoreceptive organs in Nematodes.

461. Sperms in Ascaris are characterized by one unusual feature
(a) long form
(b) lack of flagellum
(c) motility
(d) ability to induce meiosis in egg
AMU-2003

Ans. (b) : Ascaris sperm are amoeboid, asymmetrical, and have tails. Their maturation is completed in vas deferens. Male and female copulate in human intestine, by amoeboid motility, the sperm travel mainly localized in pseudopodia to the uterus, seminal receptacle where they fertilize the ovum, egg develops in soil and form rhabditiform larva which moults further into second rhabditiform larva (Juvenile). Major sperm protein (MSP) 16% of total protein sperm.

G. Annelida

462. Statement I : Peripatus is a connecting link between Annelida and Mollusca.
Statement II: Archaeopteryx is a transitional form between Reptila and Aves.
(a) Both statement I and statement II are correct
(b) Both statement I and statement II are false
(c) Statement I is correct. But statement II is false
(d) Statement I is false. But statement II is correct
TS EAMCET-10.05.2023, Shift-II

Ans. (d) : "Peripatus" It is a genus of veluet worms, which are segmented invertebrates found intropic and subtropical region.
• Peripafous is conecting link between annelida and arthopoda.
• If is living fossils.
• Archaeopteryx is connecting link between replies and bird.
• If is transitional fossil between dinosaurs and birds its appear in cafe Jurassic period.

463. Choose the incorrect statements regarding Hirudinea
A. Male reproductive system has cirrus
B. They are exclusively marine and tubicolous
C. Fertilization is external and development is direct
D. Clitellum is conspicuous during breeding season only.
(a) A, C (b) B, D
(c) C, D (d) B, C
AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Hirudinea (Leeches) are segmented parasitic belonging phylum Annelida.
Hirudinea as hermaphrodites and have clitellum. Clitellum is thickened grlandular present neare head inhirudinea and function is secreted a viscid sac which storeegg.
Clitelum is part of reporoductive system that can seen when the worm is sexually active or mature.
Maximum leach live in fresh water but some are terrestrial or manins.

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464. The spermathecae in earthworm are present in

(a) 8th and 9th segments
(b) 3th and 4th segments
(c) 6th, 7th, 8th and 9th segments
(d) 15th to last segments

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : The spermathecae in earth worm are present in 6th, 7th, 8the and 9th segmenths.
Spermathecas in earthworms are small, sac-like structures located in the clitellum which is a specializeol.
Segments of the earthworm's body.
These structures store sperm received during copulation for tall later use in fertilizing egg.

465. Match List I with List II :

List I		List II	
A.	**Taenia**	**I.**	**Nephridia**
B.	**Paramecium**	**II.**	**Contractile vacuole**
C.	**Periplaneta**	**III.**	**Flame cells**
D.	**Pheretima**	**IV.**	**Urecose gland**

Choose the correct answer from the options given below :

(a) A-II, B-I, C-IV, D-III
(b) A-I, B-II, C-III, D-IV
(c) A-I, B-II, C-IV, D-III
(d) A-III, B-II, C-IV, D-I

NEET (UG) 07.05.2023

Ans. (d)

A.	**Taenia**	**III.**	**Flame cells**
B.	**Paramecium**	**II.**	**Contractile vacuole**
C.	**Periplaneta**	**IV.**	**Urecose gland**
D.	**Pheretima**	**III.**	**Nephridia**

466. Read the following and find out the correct combinations:

(a) Coelom/Symmetry Phylum Example
Pseudocoelom Platyhelminthes Ascaris
(b) Coelom/Symmetry Phylum Example
Bilateral Cnidaria Hydra
(c) Coelom/Symmetry Phylum Example
Eucoelom Annelida Pheretima
(d) Coelom/Symmetry Phylum Example
Radial Ctenophora Obelia

TS EAMCET-30.07.2022 Shift-II

Ans. (c) :

	Coelom/ Symmetry	Phylum	Example
1.	Pseudocoelom	Aschelminthes	Ascaris
2.	Bilateral	Arthropoda	Insects
3.	Eucoelom	Annelida	Pheretima
4.	Radial	Coelentrata	Obelia

467. Study the following statements regarding unisexual annelids.

(I) These are bristle worms
(II) Gonoducts are present
(III) Head is distinct with sense organs
(IV) Internal fertilization
The correct statements are

Options:

(a) I, III only (b) II, IV only
(c) I, II only (d) III, IV only

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : Annelids are coelomate and triploblastic, body is segmented, organ level of body organization. Nephridia are present for excretion, blood contains haemoglobin (red colour), and Setae helps in the locomotion.
These are bristle worms. Head is distinct with sense organs. Nereis, an aquatic form is dioecious but earthworms and leeches are monoecious.

468. Animals of this class in Annelida have definite number of segments.

(a) Cestoda (b) Polychaeta
(c) Oligochaeta (d) Hirudinea

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : Leeches are segmented parasitic worms that comprises the sub-class Hirudinea within the phylum Annelida. Leeches have 33 body segments, and Hirudinea are monoecious. They have anterior and posterior suckers on ventral side. The organisms lay eggs in cocoons.

469. Match the items in Column-I with those in Column-II

Column-I	Column-II
(A) Podocytes	**(i) Crystallised oxalates**
(B) Protonephridia	**(ii) Annelids**
(C) Nephridia	**(iii) Amphioxus**
(D) Renal calculi	**(iv) Filtration slits**

Select the correct option from the following :

(a) (A)-(iv), (B)-(ii), (C)-(iii), (D)-(i)
(b) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(c) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)
(d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

NEET (Odisha)-2019

Ans. (d)

Column-I		Column-II	
(A)	Podocytes	(iv)	Filtration slits
(B)	Protonephridia	(iii)	Amphioxus
(C)	Nephridia	(ii)	Annelids
(D)	Renal calculi	(i)	Crystallised oxalates

470. A definite number of body segments is found in

(a) slug (b) leech
(c) earthworm (d) tapeworm

Uttarakhand PMT-2011
Rajasthan PMT-2001

Ans. (b) : The body of leech is divided metamerically into 33 true segments, somites or metameres. The first five segments are jointed to form the anterior sucker, eyes and mouth. The next 21 segments, followed by the last seven segments, are fused to form the posterior sucker. Their longitudinal muscles along with anterior and posterior suckers help in locomotion. They do not have any specific respiratory organ.

471. Metameric segmentation is the characteristic of

(a) Platyhelminthes and Arthropoda
(b) Echinodermata and Annelida

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(c) Annelida and Arthropoda
(d) Mollusca and chordata

BHU PMT (Mains)-2010
Punjab MET-2006
BCECE-2013

Ans. (c) : Metameric segmentation is characteristic of Annelids and Arthropods.
The phenomenon known as **metamerism** occurs when an organisms body is organized into a linear series of body segments. Such animals bodies have organs and tissues that are observed to be repeated after regular intervals, or segments, and each segment is referred to as a metamere or somite.

472. Connecting link between annelids and molluscs is
(a) Neopilina (b) Peripatus
(c) Periplaneta (d) Limulus

JIPMER-2010,2008

Ans. (a) : The term "connecting link" refers to an animal that possesses characters which common to two related taxonomic groups. *Neopilina* is a connecting link between Annelids and Molluscs, because it shows several characters of both Annelids and Molluscs.
• *Peripatus* is a connecting link between Annelida and Arthropoda.
• *Periplaneta* is a genus of cockroach.
• *Limulus* is a genus of horseshoe crab. It is also known as living fossil and king crab.

473. The nephridia in earthworm are analogous to
(a) nematoblasts of Hydra
(b) flame cells of Planaria
(c) gills of prawn
(d) trachea of insects

AIPMT-1996

Ans. (b) : The nephridia in earthworm are analogous to flame cells of Planaria, since both of them help in excretion.
Analogous organs are those that perform similar function but have a different anatomical structure are said to be analogous structure or organ.

474. Which one is a marine leech ?
(a) Spiunculus (b) Pontobdella
(c) Hirudo (d) Polygordius

Haryana PMT-2011
Punjab MET-2011

Ans. (b) : Pontobdella muricata is a species of marine leech, which parasitic on sharks rays, and skates.
Leech belongs to phylum Annelida.

475. Match the following

List I	List II
(A) Arenicola	**(I) Terrestrial leech**
(B) Hirudinaria	**(II) Marine leech**
(C) Pontobdella	**(III) Lug worm**
(D) Haemadipsa	**(iv) Fresh water leech**

	A	B	C	D
(a)	(I)	(II)	(III)	(IV)
(b)	(III)	(IV)	(II)	(I)
(c)	(II)	(III)	(IV)	(I)
(d)	(I)	(III)	(IV)	(II)

AP EAMCET-2015

Ans. (b) :

A	Arenicola	(III)	Lug worm
B	Hirudinaria	(IV)	Fresh water leech
C	Pontobdella	(II)	Marine leech
D	Haemadipsa	(I)	Terrestrial leech

476. Which one of the following is common in annelida and arthropods?
(a) basal nerve cord
(b) ventral nerve cord
(c) dorsal nerve cord
(d) anterior nerve cord

Rajasthan PMT-2003
Punjab MET-2004

Ans. (b) : The nervous system of Annelida resembles that of Arthropoda, both have metameric segmentation. The nervous system is basically represented by ganglia, arranged segment wise on the ventral nerve cord. Ventral nerve cords are found in some phyla particularly in the Nematodes, Annelids, and Arthropods.

477. Annelids have a central nerve cord that is :
(a) impermeable to K^+ (b) hollow
(c) dorsal (d) ventral

Punjab MET-2005

Ans. (d) : Annelids have a central nerve cord that is ventral.
• The ventral nerve cord is a collection of nerve fibers that runs along the longitudinal axis of various phyla of elongated invertebrates and is a component of the invertebrate central nervous system. It is normally a solid double-strand (pair) of nerve cords.
• Chordates animals have a dorsal, hollow nerve cord.

478. Forest of nephridia are present in:
(a) pharyngeal region (b) clitellar region
(c) anal region (d) none of these

Rajasthan PMT-2005

Ans. (b) : Forest of nephridia are present in clitellar region.
• In earthworm the excretory organs occur as segmentally arranged coiled tubules called nephridia.
• Nephridia are three types in earthworm these are septal nephridia, integumentary nephridia and pharyngeal nephridia.
• Nephridia in Earthworm almost 200-250 in number in each segment, but on the clitellum, where they reach 2000-2500 in number per segment, they are known as the "forest of nephridia." The terminal ducts of these nephridia are open on the body's surface and they lack nephrostomes.

479. Which of the following assists in the locomotion of the organism stated?
(a) Epithelium of Pheretima
(b) Trichocysts of Paramecium
(c) Pedicellariae of Star fish
(d) Posterior sucker of Hirudinaria

JIPMER-2004

Ans. (d) : The Hirudinaria posterior sucker helped the organism for locomotion. It performed looping and crawling movements with the aid of muscles and suckers. Suckers and muscles are necessary for attachment.

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480. Pheretima and its close relatives derive nourishment from:
(a) Soil insects
(b) Small pieces of fresh fallen leaves of maize, etc
(c) Sugarcane roots
(d) Decaying fallen leaves and soil organic matter

AIPMT (Screening)-2012

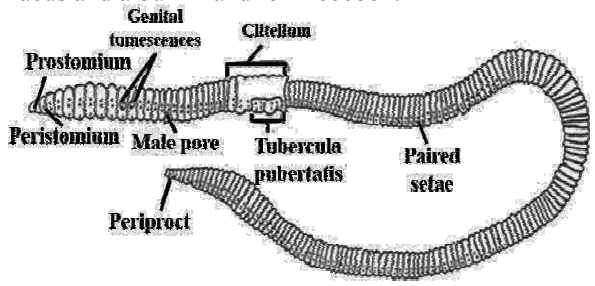
Ans. (d) : Pheretima and its related species feed on the decomposing organic matter in the soil. They consume the leftover plant and animal materials as well, thus they are omnivorous.

481. Which one of the following structure in pheretima is correctly matched with its function:
(a) Typhlosole-storage of extra nutrients
(b) Clitellum-secretes cocoon
(c) Gizzard-absorbs digested food
(d) Setae-defence against predators

AIPMT (Mains)-2011

Ans. (b) : Clitellum is a girdle which contains gland cells that emit a material that dries up to form the cocoon from which the egg and sperms are released to assure fertilization. The earthworms embryo grows inside the cocoon.

- The glandular tissue clitellum present in 14-16 segments forming a thick girdle. The gland secretes mucus and albumin and form cocoon.



482. In Polychaeta, the setae are:
(a) numerous
(b) singly arranged
(c) arranged in bundles
(d) fused

UP CPMT-2011

Ans. (a) : Polychaetes, also referred to as segmented worms, belong to phylum Annelida. On the lateral parapodia, they have a lot of setae.
They include such forms as sand worms, tube worms and clam worms.

483. The larva of phylum Annelida is called as:
(a) Miracidium (b) Trochophore
(c) Glochidium (d) Rhabditiform

VMMC-2011, 2010
Manipal-2010

Ans. (b) : The phylum Annelida contains trochophore larva. They are segmented, triploblastic, and bilaterally symmetric metazoa. It is also occurs in the phylum Molluscs. A trochophore larva is a tiny, pear-shaped, cilated, and unsegmented organism. These creatures are planktotrophs. They can be discovered in marine habitats, with the support of cilia, they move in a wheel-like motion.

484. All worms are :
(a) triploblastic (b) segmented
(c) endoparasites (d) free - living

MGIMS Wardha-2003

Ans. (a) : The term "triploblastic" refers to an animals whose body is made up of the ectoderm, mesoderm, and endoderm, the three embryonic cell layers. A triploblastic embryo is the initial phase for the development of all higher and intermediate animals.

485. How are Annelida advanced over Nematoda ?
(a) Closed circulation
(b) True coelom
(c) Metameric segmentation
(d) All of these

AMU-2006
Punjab MET-1999

Ans. (d) : Compared to Nematodes, Annelids are more advanced. They are true coelomates, and in addition to having a closed circulatory system, they exhibit metameric segmentation. While Nematodes are pseudocoelomates that lack a circulatory system and are unsegmented organisms.

486. Which of the following animal is sanguivorous ?
(a) Nereis (b) Tapeworm
(c) Earthworm (d) Hirudinaria

AMU-2005
Manipal-2004
Uttarakhand PMT-2004

Ans. (d) : The Indian cattle leech, Hirudinaria, exhibits the sanguivorous behaviour, which is characterized by blood sucking nature. When they enter a pond or river, they ingest blood from fish, frogs, cattle, and humans.

487. Which of the following animals is predaceous:
(a) Pheretima (b) Nereis
(c) Hirudinaria (d) None of these

CG PMT-2007

Ans. (b) : Nereis is a marine Polychaete Annelid that burrows under the sea floor and emerges at night for capturing for small creatures. They are free-living, nocturnal, and predaceous animal. *Nereis* possess parapodia which help in swimming. *Nereis* is dioecious and aquatic Annelids.

488. Select the correct statement:
(a) birds are poikilothermic
(b) flatworms are coelomic animal
(c) earthworm is metamerically segmented
(d) fishes are radially symmetrical

CG PMT-2007
BCECE-2005

Ans. (c) : Earthworms belong to the phylum Annelida. The characteristic features of an Annelida is the segmented body. The phenomenon known as metamerism occurs when an organisms body is organized into a linear series of body segments. Such animals bodies have organs and tissues that are observed to be repeated after regular intervals, or segments, and each segment is referred to as a metamere or somite.

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489. In Pheretima the glands that help in binding the worms during copulation are:
(a) Prostate glands (b) Albumin glands
(c) Accessory glands (d) Mucous glands

AP EAMCET-2003

Ans. (c) : The two pair of accessory gland are located on the ventral body wall, one in each of segments 17 and 19, on the lateral sides of the nerve cord. In earthworm copulation is facilitated by the secretions of accessory glands.

490. In Pheretima, the cells that are analogous to hepatic cells of vertebrates are:
(a) amoeboid cells (b) chloragogen cells
(c) mucous cells (d) circular cells

AP EAMCET-2003

Ans. (b) : Chloragogen cells in Pheretima, which is a type of earthworm, are analogous to hepatic cells in vertebrates. These cells are responsible for storing glycogen and lipids detoxifying substances, and participating in metabolic activities similar to the functions performed by hepatic cells in vertebrates.

491. Nephridia in Pheretima are formed from:
(a) mesenchyme (b) endoderm
(c) mesoderm (d) ectoderm

AP EAMCET-2004

Ans. (d) : Earthworms are triploblastic, they have three distinct germ layers endoderm, mesoderm, and ectoderm. Nephridia are found in pairs and operate similarly to the kidney in vertebrates. The earthworm's nephridia are formed from ectodermal tissues and it is responsible for excretion and osmoregulation in earthworms.

492. External segmentation is absent but internal segmentation is present in
(a) Polychaeta (b) Oligochaeta
(c) Archiannelida (d) Hirudinea

AMU-2008

Ans. (c) : The Archiannelida are only marine organisms.
Internal segmentation is identified by coelomic septa, while external segmentation is identified by barely noticeable weak grooves. The body is divided into multiple chambers that repeat organs in its internal portions. Each chamber has a pair of nephridia and a pair of ganglia.

493. Which of the following is wrongly matched?
(a) Arthropoda - cockroach
(b) Annelida - Hydra
(c) Echinodermata – star fish
(d) Nemathelminthes - Ascaris

J&K CET-2006

Ans. (b) : Hydra belongs to the phylum Coelenterate (Cnidarian) not from Annelida.
- Cockroach belongs to the phylum Arthropoda.
- Star fish belongs to the phylum Echinoderm.
- Ascaris belongs to the phylum Aschleminthes.

494. The dorsal side of the skin of Pheretima is brown due to:
(a) porphyrin (b) melanin
(c) heparin (d) renin

AP EAMCET-2001

Ans. (a) : The dorsal side of the Earthworm (Pheretima) skin is brown because of the pigment porphyrin found in the body wall, which shields the body from strong sunlight and UV rays.

495. Which of the following nephridia does not found in earthworm?
(a) Septal nephridia
(b) Macro nephridia
(c) Integumentary nephridia
(d) pharyngeal nephridia

AFMC-2004

Ans. (b) : Macronephridia are a type of specialized excretory organs found in some Annelids, specifically in the class Polychaeta. These structure are absent in earthworms. Micronephridia are typically larger and more complex than typical nephridia found in earthworms and they act as a osmoregulatory and secretory organs.

496. Match the following colums.

Column-I (Organ of Excretion)	Column-II (Name of Animals)
(A) Nephridia	1. Prawn
(B)Malpighian tubules	2. Spider
(C) Coaxal gland	3. Insect
(D) Green gland	4. Earthworm

(a) A-1 B-2 C-3 D-4 (b) A-2 B-1 C-3 D-4
(c) A-4 B-3 C-2 D-1 (d) A-4 B-2 C-3 D-1

CMC Ludhiana -2013

Ans. (c)

Column-I (Organ of Excretion)	Column-II (Name of Animals)
(A) Nephridia	4. Earthworm
(B)Malpighian tubules	3. Insect
(C) Coaxal gland	2. Spider
(D) Green gland	1. Prawn

497. Each male genital opening of Pheretima has separate opening of
(a) two ducts (b) three ducts
(c) five ducts (d) four ducts

JCECE-2010

Ans. (b) : One prostatic duct and two vasa deferentia, or spermatic ducts, are independent apertures in each male genital opening (at the 18th segment) of the Pheretima. These ducts are responsible for carrying mature sperm, facilitating ejaculation, and eliminating waste products.

498. In Pheretima locomotion occurs with the help of :
(a) circular muscles
(b) longitudinal muscles and setae
(c) circular, longitudinal muscles and setae
(d) parapodia

JCECE-2003

Ans. (c) : In *Pheretima* locomotion occurs with the help of circular, longitudinal muscles and setae. The earthworm can push the setae out of its body to grab the soil around it. To move forward, the worm uses its setae to anchor the front of its body and contracts the longitudinal muscles to shorten its body.

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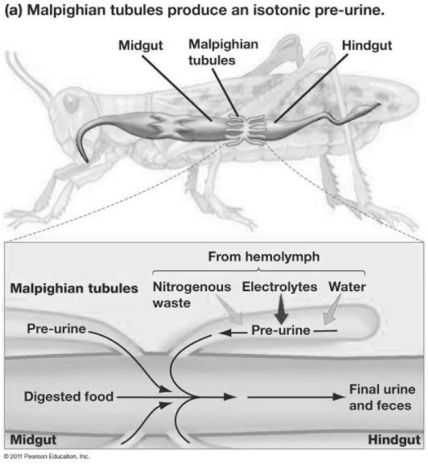
H. Arthropoda

499. Malpighian tubules are:
(a) Excretory organs of insects
(b) Excretory organs of frog
(c) Respiratory organs of insects
(d) Endocrine glands of insects

VMMC-2012 / UP CPMT-2008
MGIMS Wardha-2008
Rajasthan PMT-2008
AIPMT-1990 / UP CPMT-2012

Ans. (a) : Malpighian tubules are found in some insects, which belongs to the phylum Arthropoda.

Malpighian tubules are excretory organs found in insects. They are responsible for removing waste material, such as nitrogenous compounds, from the insect's body. These tubules maintain the internal environment of insects by regulating the balance of water and ions. Malpighian tubules are similar function as kidneys of vertebrates.



500. Which of the following is not an insect?
(a) Locust (b) Lepisma
(c) Termites (d) Spider

Rajasthan PMT -2011 / JIPMER-2005
BVP-2002 / Rajasthan PMT-1999

Ans. (d) : Spider is not an insect because spiders are Arachnids and do not have antenna or wing for flying. Spiders are Arthropods that have eight legs. They have two main body parts, two pincer-like numerous appendages, and three pairs of spinnerets.

501. Superficial meroblastic cleavage occurs in :
(a) reptiles (b) birds
(c) mammals (d) insects

AFMC-2006, 2008
Punjab MET -1999
AIPMT-1991

Ans. (d) : Superficial meroblastic cleavage that occurs in eggs that have a large amount of yolk. The cleavage furrows only penetrate the cytoplasm at the periphery of the egg, leaving the yolk unsegmented. This type of cleavage is founds in insects, which have centrolecithal eggs.

502. Green glands present in some arthropods help in:
(a) respiration (b) excretion
(c) digestion (d) reproduction

Punjab MET-2009
CMC Vellore-2009
Rajasthan PMT-2009
UP CPMT-2001, 2009

Ans. (b) : The excretory organs in the class of Crustaceans consist of a pair of green-colored organs. At the base of the antennae, these glands open. These glands are sometimes known as **antennal or maxillary glands**. They function like invertebrate kidneys. They help in the ion control and removal of wastes materials.

503. Statement I: Cestodes lack digestive system
Statement II: Arachnids have green glands for excretion.
The correct option among the following is :
(a) Both statement I and statement II are correct
(b) Both statement I and statement II are false
(c) Statement I is correct But statement II is false
(d) Statement I is false But statement II is correct

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Cestoda is parasitic worm belonging β phylum platyhelminthes.

Castodari are mainly fish infecting parasites. Cestodes do not have gut or mouth but absorb nutrients from the host's alimentary tract. Thus digestive system totally absent.

• In arachnids is the class of the phylum arachnida and phylum arthropod. Arthopodce largest phylum of animal kingdom. and axcretory orgon of archarids is coxal gland and malphygtian tubules.

504. Choose the correct option

Column - I			
A-	**Daphnia**	**i.**	**Basking**
B-	**Desert Lizard**	**ii.**	**Blubber**
C-	**Aquatic mammals**	**iii**	**Cyclomorphosis**
D-	**Sea gulls**	**iv**	**Eliminates salts through nostril**

(a) A – ii, B – iii, C – iv, D – i
(b) A – iii, B – ii, C – i, D – iv
(c) A – iii, B – i, C – ii, D – iv
(d) A – iiii, B – i, C – iv, D – ii

AP EAPCET-22.05.2023, Shift-I

Ans. (c) :
- Aquatic mammals like Amazonian manatee and river dolphins are completely aquatic.
- Chyclomorphosis is different generation of individual of the same species cause by seasonal differences.
- Daphnia is commonly called water flease because the salutatory. Swimming style which look like fleas.
- Desert horned lizard also called "horny toads"
- Sea gull are seabirds

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505. Choose the incorrect combination among the following.

Class	Character	Example
1) Xiphosura	Poisonous Claws	Limulus
2) Arachnida	Coxal Glands	Scutigera
3) Crustacea	Biramous appendage	Sarcoptes
4) Diplopoda	Gnathochilarium	Spirostreptus

(a) 2, 3, 4 (b) 1, 3, 4
(c) 1, 2, 4 (d) 1, 2, 3

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : Diplopod is class of arthropoda which have two pairs of Jointed legs. e.g. eumillipes
Pensephon. Diplopod commonly known as millipetes. Millipedes are a generally show moving the herbivoroue, feeding on decaying plant matter and sometimes live plant.

506. The following are stages of plasmodium in female Anopheles. Their correct sequence is
I) Syngamy
II) Sporocyst
III) Formation of Ookinete
IV) Gametogony
V) Oocyst
(a) IV - I - III - II - V (b) II - V - III - IV - I
(c) IV - V - I - III - II (d) IV - I - III - V - II

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : • The gametocytes effective stage for infected femal anopheles mosquito.
• Sporozoits a motile form ofinfected fumal anaphelese mosquito
• Oocyst a thich walled structures that forms under the mosquito outer gut lining.
Ookinete- The motiles from by fusion of a male female gamele and meiosis take place and form okinete
gamete-make gametocytes have many flagellated microgamets but female gametocyte differentiated to a macrogamete.

507. Read the following regarding Monarch butterfly
A. The Monarch butterfly is highly distasteful to its predator because of a special chemical present in its body.
B. The butterfly acquires the chemical during its caterpillar stage by feeding on a poisonous insect.
The correct option among the following is
(a) Both A and B are true
(b) A is false B is true
(c) A is true B is false
(d) Both A and B are false

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : The monarch butter fly is highly distasteful to its predator because of a special chemical present in body because-they store posison know as cordiac glycosides or cordenolides.
The caterpillar of the monarch butterfly eats only milkweed a poisonous plant that should kill it the caterpillars thrive on the plant even storing its toxins in their bodies as a defense against hungry birds.

508. In hymenopteran insects the unfertilized eggs develop into
(a) Queen bee (b) Worker bee
(c) Super females (d) Drones

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : In hymenopteran insects the unfertilized eggs develop into Drones.
The hymenoptera order of phylum arthropoda and family is called Beekeepers or apiarists.
When none bee goes by many developmental stage and form queen, worker and drone and four stage like egg, larva, pupa and adult the queen lays her egg in hony comb fertilize egg develop into workers or new queen but unfertilized egg develop into drones.

509. Identify the correct option
Statement - I : Some insects add glycerol to their blood as antifreezing agent during winter
Statement - II : Insects are temperature regulators
(a) Statement I and II are correct
(b) Statement I is wrong and II is correct
(c) Statement I is correct and II is wrong
(d) Statement I and II wrong

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : When insects encounter cold temperatures during winter face the sick of their bodily fluids freezing which can be deadly. That is why insects developed a survive strategy by producing glycerol.
Glycerol is a natural antifreeze agent that lowers the freezing does not have temerature regulators.

510. House fly belongs to _____ family.
(a) Calliphoridae (b) Muscidae
(c) Cyprinidae (d) Hominidae

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : House fly belongs to muscidae family. Muscidae are commonly known as house flies or stable flies. The worldwide distribution of these contains almost 4000, described species in over 100 genera.
- Calliphoridae is the family of blow flies.
- Cyprinidae is the family of freshwater fishes.
- Hominidae is the family of apes.

511. In which of the following animals, digestive tract has additional chambers like crop and gizzard ?
(a) Pavo, Psittacula, Corvus
(b) Corvus, Columba, Chameleon
(c) Bufo, Balaenoptera, Bangarus
(d) Catla, Columba, Crocodilus

NEET-2022

Ans. (a) : Pavo, Psittacula and Corvus are all different types of birds, and they share the common characterstic of having a digestive tract with two additional chambers called the crop and gizzard. The crop is a sac like organ that stores food before its passess into the stomach. The gizzard is a muscular organ that grinds food with the help of small stones that the birds swallows.

512. Which of the following is an extinct marine Arthropoda?
(a) Dalmanites (b) Limulus
(c) Scolopendra (d) Scutigera

AP EAPCET-12.07.2022 Shift-I

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Ans. (a) : The genus Dalmanite belongs to the order Phacopida suborder of Trilobites. They existed from the late Ordovician through the middle of the Devonian. *Redlichiids* and *Ptychopariid bigotinids,* which date to about 520 million years ago, are the earliest trilobites known from the fossil record.

513. In the process of evolution, striated muscles appeared for the first time in the phylum

(a) Annelida (b) Mollusca
(c) Arthropoda (d) Echinodermata

AP EAMCET-11.07.2022 Shift-II

Ans. (c) : In the process of evolution, striated muscles appeared for the first time in the phylum Arthropoda, arranged in bundles for moving particular parts.

514. Lepisma is commonly known as

(a) Jelly fish (b) Cuttle fish
(c) Devil fish (d) Silver fish

TS EAMCET-30.07.2022 Shift-II

Ans. (d) : • Lepisma is commonly known as silver fish. It belongs to phylum Arhropoda. It is found in moist environments. Silver fish are pests because they eat books, wallpaper and other material that contain starch.

• Cuttlefish belong to the class cephalopoda included squid, octopus etc.

• Devil fish (giant squid) is the largest invertebrates in the world.

• **Jelly fish-** belong to coelenterate or cnidaria

515. Which set of excretory organs is found in Arthropoda?

(a) Malphigian tubules, coxal glands and green glands
(b) Malphigian tubules and flame cells
(c) Flame cells and solenocytes
(d) Nephridia and flame cells

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : Coxal gland - Coxal gland in certain arthropods one of a pair of excretory organs consisting of an end sac where intial urine is collected a tubule where secretion and reabsorption may take place and an excretory pore at the base of one of the legs.

Green gland -Paired maxillary and antennal gland (also called green glands) are the principal excretory organs in crustaceans. Ex. prawn(palaemon)

Malphigian tubules- Primary osmoregulatory and excretory organ of insects. Ex. Cockroach.

516. A unit of photoreception in the eye of cockroach is _____

(a) Facet
(b) Crystalline Cone
(c) Rh abdome
(d) Ommatidium

AP EAMCET-03.09.2021 Shift-II

Ans. (d) : Arthropods eyes are made up of repeating units of the ommatidia, each of which junctions as a separate visual receptor.

517. Study the following and find the correct combinations related to Arthropoda

Subhylum / class		Character		Example	
i	Arachnida	A	Extinct marine arthropods	P	Julus
ii	Crustacea	B	Gnathochilarium	Q	Dalmanites
iii	Chilopoda	C	Poison claws	R	Aranea
iv	Diplopoda	D	Biramous thorasic & abdominal appendages	S	Scolopen-dra
v	Trilobita	E	Spinnerets	T	Cancer

Options:

(a) (i-B-R), (ii-D-Q), (iii-C-S), (iv-E-T) & (v-A-P)
(b) (i-E-R), (ii-D-T), (iii-C-S), (iv-B-P) & (v-A-Q)
(c) (i-E-R), (ii-D-T), (iii-B-P), (iv-C-S) & (v-A-Q)
(d) (i-B-P), (ii-D-T), (iii-E-R), (iv-C-S) & (v-A-Q)

AP EAMCET-03.09.2021 Shift-II

Ans. (b) :

	Character	Ex.
(i) Arachnida	Spinnerets	Aranea
(ii) Crustacea	Biramous thoracic and abdominal appendages	Cancer
(iii) Chilopoda	Poison claws	Scolopendra
(iv) Diplopoda	Extinct marine arthropods	Dalmanites

518. Which of the following features is not present in the phylum 'Arthropoda' _____

(a) Metamorphic segmentation
(b) Chitinous exoskeleton
(c) Jointed appendages
(d) Parapodia

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : Arthropods have chitinous exoskeletons with jointed appendages and metameric segmentation. The parapodia that are present in the phylum Annelida are primarily used for breathing and movement. Hence, Parapodia is not present in the phylum Arthropoda.

519. Statement 1- Arthropoda is largest phylum of Animalia which includes insects.
Statement 2- Over one-fourth of all named species on earth are arthropods

(a) Both statements 1 and 2 are correct and statement 2 is the correct explanation of statement1.
(b) Both statement 1 and 2 are correct but statement 2 is not the correct explanation of statement 1.
(c) Statement 1 is correct and statement 2 is incorrect
(d) Both statements 1 and 2 are incorrect

AP EAMCET-25.09.2020 Shift-I

Ans. (c) : Arthropoda is the largest phylum of Animalia which includes insects. Over two-third of all named species on earth are Arthropods. The body of Arthropods is covered by chitinous exoskeleton.

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520. Match the following:

Sclerite	Location on the head of Cockroach
(A)Vertex	(I) Cheek Sclerite
(B) Frons	(II) Sclerite bordering the occipital foramen
(C) Clypeus	(III) Front large sclerite
(D) Gena	(IV) Narrow rectangular sclerite
	(V) Top of the head

The correct match is

	A	B	C	D
(a)	V	III	IV	I
(b)	III	II	V	IV
(c)	V	I	IV	III
(d)	III	IV	II	I

TS EAMCET-29.09.2020 Shift-II

Ans. (a) :

Vertex – Top of the head
Frons – Front large sclerite
Clypeus – Narrow rectangular sclerite
Gena – Cheek sclerite

521. Male larva of silkworm possesses:

(a) Ishiwata's gland (b) Herold's gland
(c) Green gland (d) Pineal gland

Tripura JEE-2019

Ans. (b) : Male silkworm larvae have a milky white patch called the **Herold gland** that is located between segments 8 and 9 ventrally. In the female, there are two milky white patches on segments 8 and 9, which are referred to as the fore and hind glands, respectively.

522. Match the following lists:

	List-I		List-II
A	Lepidopterans	i	Cry II Ab
B	Coleopterans	ii	Flies, mosquitoes
C	Dipterans	iii	CryI Ab
D	Corn borer	iv	Tobacco budworm, Army worm
		v	Beetles

The correct match is:

	(A)	(B)	(C)	(D)
(a)	v	ii	iv	iii
(b)	iii	ii	i	v
(c)	v	iv	i	iii
(d)	iv	v	ii	iii

TS EAMCET-09.05.2019 Shift-I

Ans.(d):

List - I	List-II
(A) Lepidopterans	tobacco budworm,worm army
(B) Coleopterans	Beetles
(C) Dipterans	Flies, Mosquitoes
(D) Corn borer	Cry I Ab

523. The muscles associated with the heart of insects are:

(a) alary (b) radial
(c) striped (d) pericardial

AP EAMCET-1998 / Punjab MET-2019

Ans. (a) : Alary muscles are associated with the heart of insects. An insect's dorsal diaphragm is located beneath the heart. The dorsal diaphragm is linked to 12 pairs of alary muscles. These muscles support the heart's normal operation.

524. Choose correct option for larva of housefly:

(a) Grub (b) Cypris
(c) Maggot (d) Wriggler

JIPMER-2019 / JCECE-2009
DU MET-2004

Ans. (c) : A maggot is a housefly larva. In contrast to larvae of the Nematocera, such as mosquitoes and crane flies, it is specifically used for the larva of cheese flies and blowflies. Typically, grubs are used to describe beetle larvae. The barnacle's final larval stage is called a cypris larva. A mosquito's aquatic larva is called a wriggler.

525. Trilobite larva is present in the development of

(a) Scolopendra (b) Limulus
(c) Palamnaeus (d) Palaemon

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Limulus is a taxonomic genus of the family limulidae, commonly known as horseshoe crabs or king crab. Morphologically, the horseshoe crabs look like crabs but they are more closely related to the arachnids. these animals are horsehoe-shaped and with a hard carapace and a spine-like tail. They have five pairs of appendages.

526. Which among the following belong to same phyla?

(a) Physalia, Obelia, Pleurobrachia – Coelenterata
(b) Bombyx, Palaemon, Limulus – Arthropoda
(c) Star fish, jelly fish, Sea urchin – Echinodermata
(d) Cattle fish, devil fish, Patella – Mollusca

AIIMS-26.05.2018 Shift-II

Ans. (b) : Bombyx, Palaemon, and Limulus all belongs to the Arthropoda.
It is the largest phylum of animals, which includes insects. The body is covered by a chitinous exoskeleton. The body is divided into three sections: the head, the thorax, and the abdomen. They have jointed appendages.

527. In insects, the respiratory system is classified on the basis of

(A) Number of spiracles
(B) Nature of spiracles
(C) Position of spiracles
(D) Structure of spiracles

Options:

(a) A, C (b) A, B
(c) A, D (d) B, D

AP EAMCET-28.04.2017 Shift-II

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Ans. (b) : In insects, the respiratory system is classified based on the number and nature of spiracles. The largest number of spiracles found in insects is 10 pairs, 2 thoracic, and 8 abdominal.

528. Commercial silk is obtained from :
(a) cocoon/pupa
(b) caterpillar
(c) adult moth
(d) both egg and adult moth

MGIMS Wardha-2003

Ans. (a) : Mulberry silkworm (*Bombyx mori*) that produes silk in its cocoon. These silkworm's caterpillars eat the leaves of mulberries, and their salivary glands secrete liquid silk.
The larva's silk gland is created by modifying the salivary gland (labial gland). From the cocoon, silk is obtained. The cocoon is made of a single thread of silk that can be upto 1000 m long.

529. Lac is obtained from:
(a) Laccifer (b) Bombyx
(c) Dactylopius (d) Lytta

MGIMS Wardha-2003

Ans. (a) : A variety of Lac Insects species secrete a reddish brown resinous substance known as **Lac.** *Laccifer lacca,* an Indian Lac insect, is significant commercially, found banyan and other plants like Palas, Kusum, and Ber etc, in tropical or subtropical areas.

530. In honey bee royal jelly is secreted from:
(a) corp gland (b) wax gland
(c) pharyngeal gland (d) salivary gland

MGIMS Wardha-2003

Ans. (c) : Royal jelly in honey bees is secreted from the pharyngeal glands of young worker bees. It's a nutrients rich substance that serves as the main food for developing queen bee larvae.

531. Which of the following animal belongs to class Crustacea?
(a) Cockroach (b) Cyclops
(c) Grasshopper (d) Mosquito

WB JEE-2010
BCECE-2006

Ans. (b) : Cyclops belongs to class Crustacea.
They are class of organisms with flexible body, single eye and thick exoskeletons. Calcium carbonate shell makes up the exoskeleton. They can freely swim in water. They are related to crabs, shrimp, prawns, and other animals.
• Cockroach, Grasshopper and Mosquito belong to class Insecta.

532. The major excretory product of arthropods is:
(a) ammonia
(b) urea
(c) uric acid
(d) trimethylamine oxide

BVP-2010

Ans. (c) : The major excretory product of arthropods is uric acid. The harmful ammonia is changed into uric acid, which is a water-saving strategy well-suited for their environment before being expelled in birds, reptiles, and the majority of terrestrial arthropods; as a result, these species are known as uricotelic organisms.

533. Which of the following insect is economically useful?
(a) Laccifer lacca (b) Culex
(c) Musca (d) Dragon Fly

UP CPMT-2010

Ans. (a) The commercially grown Lac insect is called *Laccifer lacca* or *Tachardia lacca.*
On host plants like ber, kusum, palas, and other species, it is primarily cultivated in India and Bangladesh.
• Lac has finds many application-
(i) It is used for making toys that are used in plastics.
(ii) It is used for makings sealing wax and also used in gramophone records.
(iii). The most common byproduct of lac is nail-paint which is used as cosmetics.
(iv). The shell of lac is used in preparation of paints.
(v). Lac is commonly used in making the ink that is used in printers.
(vi). Lac is commonly used as insulating material.

534. Class of spider is:
(a) Reptilia (b) Araneae
(c) Arachnida (d) Neoptera

UP CPMT-2010
AMU-1998

Ans. (c) : Arachnida are a group of joint-legged invertebrate animals (Arthropods) that belong to the Chelicerata subphylum. Spiders, scorpions, ticks mites, camel spiders, and other Arachnids are among the group.

535. The largest phylum in respect of number of species is:
(a) Coelentrata (b) Arthropoda
(c) Protozoa (d) Porifera

UP CPMT-2003
DUMET-2005

Ans. (b) : The largest phylum is Arthropoda, which contains over nine lakh species. They could be parasitic, aquatic, and terrestrial. They have chitinous exoskeletons and appendages with joints. Arthropods are found in almost every habitat on earth and adapted to a wide range of ecological niche.

536. Butterfly belongs to:
(a) Homoptera (b) Procoptera
(c) Hemiptera (d) Lepidoptera

UP CPMT-2003
DUMET-2005

Ans. (d) : Lepidoptera is one of the most well-known and widely distributed insect orders in the world. The entire body of this order is covered in scales, and it possesses wings and a proboscis as well.

537. An insect without metamorphosis is:
(a) silver Fish (b) cray fish
(c) bedbug (d) pediculus

Uttarakhand PMT-2007

Ans. (a) : A biological process of physical development of an animal after birth that involves abrupt changes in the animal's body structure with the cell growth and differentiation is called **metamorphosis.**

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• No metamorphosis occurs in the most primitive insects, like springtails and silverfish. The only change that takes place in these insects is an increase in size as the insect develops. Silver fish are unique Arthropods that develop through a process called a **metabolous metamorphosis.** This means no metamorphosis or transformation.

538. House-fly possesses:
(a) two pairs of wings
(b) one pair of wings
(c) three pairs of wings
(d) none of the above

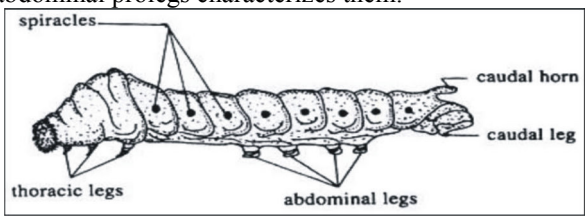
Uttarakhand PMT-2007

Ans. (b) : House-fly belongs to the order Diptera, which means "two wings". The single pair of wings is located on the middle segment of the three segmented thorax.

539. The larva of Bombyx mori is:
(a) cocoon (b) nymph
(c) caterpillar (d) trochophore

DUMET-2009 / Uttarakhand PMT-2007 BVP-2008

Ans. (c) : *Bombyx mori* is the scientific name for the **silkworm moth.** The larva of the silkworm is called a **caterpillar**. Caterpillars are the second stage in the life cycle of moth or butterfly. A long, cylindrical body with three pairs of jointed legs on the thorax and five pairs of abdominal prolegs characterizes them.



540. Which of the following respiratory organs are present in spiders and scorpions?
(a) Book lungs (b) Gills
(c) Gill books (d) Lungs

AFMC -2009

Ans. (a) : Spiders and scorpions have specialized respiratory organs called **book lungs**. These structures, found in their abdomens, allow for gas exchange similar to lungs. Book lungs help these arachnids to breathe on land.

541. The stages between larval moults in an insects are called:
(a) pupae (b) instars
(c) grubs (d) caterpillars

J&K CET-2012

Ans. (b) : The developmental stage of an Arthropods between moults is known as an **instar.** An insect is considered to be in its first instar after emerging from the egg. The next instar occurs after the insect moults, and so on. Both incomplete and complete metamorphosis in insects are referred to as an instar.

542. Which of the following is incorrect regarding insect ?
(a) Cephalization and unjointed appendages
(b) Chitinous exoskeleton and wings
(c) Cephalization and complete metamorphosis
(d) Well developed sensory organs and haemocoel

Rajasthan PMT-1998

Ans. (a) : Class Insecta also known as Hexapoda of phylum Arthropoda.
• Body is covered by chitinous exoskeleton.
• They show cephalization i.e, the ganglia, sensory organ and the mouth get concentrated in the head region forming a CNS.
• Complete metamorphosis contains 3 transformative stages.
• The sensory organs in insects are well developed and they have a circulatory system of open type in which the blood flows through the body cavity directly.
• This body cavity is known as the haemocoel.

543. Find out the correct pair of phylum example :
(a) Echinodermata - Cuttle Fish
(b) Arthropoda - Silver fish
(c) Pisces - Jelly fish
(d) Mollusca - Star fish

Rajasthan PMT-1998

Ans. (b) : A silverfish is a small, primitive insect belongs to order Zygentoma and class Insect. Its common name come from the animal's silver light grey color and the movement that resembles that of a fish.
• Cuttlefish is a marine animal belonging to the phylum Mollusca.
• Starfish is a star-shaped echinoderm belonging to the phylum Echinodermata.
• Jelly-fish is free-swimming marine animal with umbrella-shaped bells belonging to the phylum Cnidaria.

544. Which insect is useful for us ?
(a) Periplanata (b) Musca
(c) Bombyx (d) Mosquitoes

MGIMS Wardha-2005

Ans. (c) : Bombyx mori "Mulberry silk moth" is an insect that produces silk.
It is commercially significant because it is the main source of silk fiber. These are monophagous species that feed only on mulberry leaves, and they're originated in Northern China.

545. Identify the correct match between List-I and List-II :

List-I (Insect parts)	List – II (Peculiarity of mouth)
A. Laccifer	1. Elongated gales well developed
B. Musca	2. Mandibles
C. Beetle	3. Saw-like maxillae
D. Moth	4. Pseudotrachae
	5. Vestigeal mandibles

The correct match is:

	A	B	C	D
(a)	5	4	2	1
(b)	3	4	5	1
(c)	1	2	3	4
(d)	3	4	2	1

AP EAMCET-2004

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Ans. (d) :

A. Laccifer	(3) Saw-like maxillae
B. Musca	(4) Pseudotrachae
C. Beetle	(2) Mandibles
D. Moth	(1) Elongated gales well developed

546. Common characteristics of mosquitoes, houseflies and cockroaches are :
(a) one pair each of wings and halters
(b) three pair of legs and one pair of developed wings
(c) two pair of legs and two compound eyes
(d) compound and simple eyes

Rajasthan PMT-2011
Haryana PMT-2004

Ans. (b) : These insects (mosquitoes, houseflies and cockroaches) are the organism which are belonging to the group of Arthropoda.
- These organisms have 3 pair of legs and one pair of developed wings.
- The body is composed of 3 parts known as head, thorax and abdomen.
- They have two antennae in the head region which are the sensors for smell or olfaction.
- They have compound pair of eyes which are called as ocelli.

547. Termites cannot digest cellulose of wood in the absence of:
(a) trichonympha (b) trichomonas
(c) mycobacterium (d) pulvinus bird

AP EAMCET-2002, 2001

Ans. (a) : *Trichonympha* is a zooflagellate found in termite guts that digests cellulose. It secretes β-glucosidases, which is cellulose-digesting enzymes that break down cellulose into glucose.
The termites starve to death in the absence of Trichonympha.

548. Arthropods are characterized by:
(a) jointed appendages
(b) open blood vascular system
(c) triploblastic
(d) All of the above

AMU-2005
Manipal-2003
J & K CET-2012

Ans. (d) : Phylum Arthropoda is characterized by the following features -
(i) Their body is triploblastic, coelomate, bilaterally symmetrical and metamerically segmented.
(ii) Each thoracic segment has a pair of jointed legs used for locomotion, feeding or sensory purpose.
(iii) They possess a chitinous exoskeleton that undergoes periodic moulting.

549. Which one is a neem product used as insect repellent ?
(a) Azadirachtin (b) Rotenone
(c) Parathion (d) Endrin

AFMC-2004

Ans. (a) : Azadirachtin, a limonoid-group chemical molecule that serves as an insect repellant, is a secondary metabolite found in the neem seeds and it is considered as low toxic.

550. Sericteris (silk gland) are modified:
(a) Intestinal gland (b) Gastric gland
(c) Salivary gland (d) Endocrine gland

VMMC-2008

Ans. (c) : Sericteris, silk glands, found in spider and certain insects, are modified salivary glands that produce silk. This silk helps in building webs, making egg sacs, and movemenent. Silk glands are located in the abdomen and spiders use spinnerets to manipulate and spin silk fibers for various purposes.

551. Ants belong to order:
(a) Lepidoptera (b) Rhizopoda
(c) Arthropoda (d) Hymenoptera

BVP-2013

Ans. (d) : Ants belongs to the order Hymenoptera, which includes bees wasps, and sawflies. Hymenopterans have two pairs of wings exhibit social behaviors, and are important pollinators. They are known for their diverse roles within colonies ad their stinging ability.

552. Blood does not transport oxygen in:
(a) earthworm (b) pigeon
(c) cockroach (d) hirudinaria

BVP-2013

Ans. (c) : Cockroaches do not use hemoglobin to carry oxygen, hence they do not have red blood. Their blood stream does not carry oxygen either. Hence a cockroach has colorless blood. Blood of cockroaches hemolymph a clear fluid that lacks haemoglobin. The hemolymph is cockroaches primarily serves as a means of nutrient transport and waste removal.
- Colourless blood is mainly founds in male cockroaches, while the female cockroaches may have orange coloured blood.

553. Apis dorsata refers to:
(a) rock bee (b) little bee
(c) Indian bee (d) European bee

BVP-2012

Ans. (a) : *Apis dorsata* also known as **giant honey bee or rock honey bee.** This species is noticeable larger and longer in shape than another honeybees, compared to the common honeybee, they might appear more brighter and more striking in color.

554. Study of ticks and mites is:
(a) Acarology (b) Entomology
(c) Malacology (d) Carcinology

Manipal-2010

Ans. (a) : The study of ticks and mites, which are small Arthropods that belong to the class Archnida is called as **Acarology.**
- **Entomology :** The study of insects.
- **Malacology :** The study of molluscks, such as snails and clams.
- **Carcinology :** The study of crustaceans, such as crabs and lobsters.

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555. Excretory product of spider is:
(a) uric acid (b) ammonia
(c) guanine (d) none of the above
CMC Vellore-2009
UP CPMT-2009, 2007

Ans. (c) : Spiders excrete guanine as a waste product. Guanine is a nitrogenous base that is a component of DNA and RNA, and spiders excrete it as white, powdery substances.

556. Excretory organ of spider is :
(a) coxal gland (b) flame cells
(c) Malpighian tubule (d) nephridia
BCECE-2004

Ans. (a) : In some Arthropods, the coxal gland is a pair of excretory organs that includes an end sac that is located in the prosoma and is accessible to the environment at the coxae of the walking legs. It is a tubule where the first urine is collected and where secretion and reabsorption may occur. It is present in spiders.
- **Flame cell -** Flame cell/solenocytes are the cheif excretory structure of Platyhelminthes.
- **Malpighian tubule** are excretory organs of insects. These are lying almost freely in haemocoel and open into alimentary canal.
- **Nephridia** are an invertebrate organ that is found in pairs and serves a similar purpose to the kidneys of vertebrates. It eliminates metabolic waste from an animal's body.

557 The development of adult characteristics in a moulting insect is promoted by:
(a) thyroxine
(b) ecdysone
(c) pheromone
(d) juvenile hormone
Uttarakhand-2005

Ans. (b) : The development of adult characteristics in a moulting insect is promoted by ecdysone.
Ecdysone, a steroid hormone released by the prothoracic gland, accelerates insect metamorphosis and controls moulting when it is active.

558. In which of these animals, antennal gland functions as excretory organ?
(a) Human being (b) Cockroach
(c) Planaria (d) Prawn
(e) Earthworm
Kerala PMT-2008

Ans. (d) : The excretory organs in prawns are called **antennary glands or "green glands"** because they are situated close to the base of the larger antennae. Antennal gland functions as excretory organ in prawn.
- The excretory organ of the human is kidney
- The excretory organ of cockroach is Malpighian tubules.
- The excretory organ of Planaria is flame cells.
- The excretory organ of earthworm is Nephrida.

559. Limulus belongs to:
(a) Chilopoda (b) Crustacea
(c) Arachnida (d) Merostomata
BVP-2001

Ans. (d) : Horseshoe crabs (Limulus) belongs to the phylum Arthropoda, come under the class Merostomata, a primitive class of animal that first appeared in the early Cambrian, includes these horseshoe crabs. They currently make up a very small group, consisting of three genera and four species.

560. Heamocyanin is found in :
(a) Nereis (b) Leech
(c) Earthworm (d) Prawn
BVP-2000

Ans. (d) : Heamocyanin is a blue, copper-containing respiratory pigment found in Crustaceans and Molluscs. Most of the prawns are free living aquatic species while some can be terrestrial or parasitic. They have an open circulatory system and contain haemocyanin making their blood appear blue in colour.

561. Match column I with column II for housefly classification and select the correct option using the codes given below:

Column I	Column II
A. Family	**1. Diptera**
B. Order	**2. Arthropoda**
C. Class	**3. Muscidae**
D. Phylum	**4. Insecta**

(a) A-3 B-1 C-4D-2 (b) A-3 B-2 C-4 D-1
(c) A-4 B-3 C-2 D-1 (d) A-4 B-2 C-1 D-3
NEET-2016 Phase-II

Ans. (a) : Phylum – Arthropoda
Class – Insecta
Order – Diptera
Family – Muscidae

562. Which of the following are correctly matched with respect to their taxonomic classification?
(a) Spiny anteater, sea urchin, sea cucumber – Echinodermata
(b) Flying fish, cuttlefish, silverfish – Pisces
(c) Centipede, millipede, spider, scorpion - Insecta
(d) House fly, butterfly, tsetse fly, silverfish - Insecta
NEET-2013

Ans. (d) : All these organisms belong to the phylum Insecta. This category of phylum includes organisms that have three pairs of legs attached to a segmented body. From the above option, the correct matching of organisms with their taxonomic classification is Houseflies, butterflies, tsetse flies, and silverfish insects.

563. Which group of animals belongs to the same phylum?
(a) Sponge, Sea anemone, Starfish
(b) Malarial Parasite, Amoeba, Mosquito
(c) Earthworm, Pinworm, Tapeworm
(d) Prawn, Scorpion, Locusta
NEET-2013

Ans. (d) : Prawns, scorpions, and locusts belong to the same phylum. The prawn belongs to the phylum Arthropoda. It is consumed by humans as nutritious and

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tasteful food. Scorpions also belong to the phylum Arthropoda. Their bodies are divided into segments and covered with a cuticle consisting of chitin and tanned protein. The locust also belongs to the phylum Arthropoda. The phylum Arthropoda consists of invertebrate animals having an exoskeleton, a segmented body, and paired jointed appendages.

564. 3- segmented club shaped maxillary pulp is present in:
(a) male Culex (b) male Anopheles
(c) female Culex (d) female Anopheles
UP CPMT-2007

Ans. (b) : The three-segmented club-shaped maxillary palp is present in male Anopheles mosquitoes.
The maxillary palps are a pair of appendages that project from the sides of the mosquitos head. They are used for tasting, touching, and grasping. In male Anopheles mosquitoes, the maxillary palps are three-segmented and club-shaped. This helps them to grasp the female mosquito during mating.

565. Daphnia is commonly know as
(a) clam shrimp (b) fairy shrimp
(c) water fleas (d) tadpole shrimp
UP CPMT-2007

Ans. (c) : Water fleas are the common name for Daphnia. Daphnia is a planktonic crustacean of the family Daphnidae. It is a freshwater flea

566. Moulting hormone is secreted by
(a) corpora cardiacum
(b) prothoracic gland
(c) corpora allata
(d) neurosecretory hormone
JIPMER-2005, 2008

Ans. (b) : Moulting hormone is secreted by **prothoracic gland**. The prothoracic gland is also known as the **molting gland**. The molting hormone affects many cells throughout the body, but its principle function is to stimulate a series of physiological events that lead to the synthesis of a new exoskeleton. The hormone secreted from the prothoracic gland is ecdysone, which is known as the molting hormone.

567. Which one feature is common to leech, cockroach and scorpion?
(a) Nephridia (b) Ventral nerve cord
(c) Cephalization (d) Antennae
AIIMS-2009

Ans. (b) : The central nervous system of invertebrates is primarily composed of the ventral nerve cord. It serves the same purpose as the vertebrate spinal cord. Signaling from the brain to the body is coordinated through the ventral nerve cord. Arthropods and Annelids both have a ventral nerve cord that runs beneath the gut and connects to the central ganglia. While the ventral nerve cord in Arthropods is related to the brain in the head area, it is attached to the cerebral ganglion in Annelids.

568. Which one of the following is referred as 'living fossils'?
(a) Sarcoptes (b) Daphnia
(c) Limulus (d) Balanus
AIIMS-2015

Ans. (c) : *Limulus* is a genus of horseshoe crab. It is an living fossil, belonging to the phylum Arthropoda, family Limulidae, and genus Limulus. The horseshoe crab is considered a living fossil because it is one of the very few animals that are still around, and we can find fossils of it dating back 500 million years.

569. What is common among silverfish, scorpion, crab and honey bee?
(a) jointed legs (b) Metamorphosis
(c) Compound eyes (d) Poison glands
AIPMT-1997
Haryana PMT-2000

Ans. (a) : Arthropods mean jointed appendages. Silverfish, scorpions, crabs, and honey bees belong to the phylum Arthropoda and have jointed legs. The phylum Arthropoda is the largest in the kingdom Animalia.

570. Insects eggs are :
(a) microlecithal and centrolecithal
(b) megalecithal and isolecithal
(c) megalecithal and centrolecithal
(d) megalecithal and telolacithal
Punjab MET-2006

Ans. (c) : Eggs with a lot of yolk are referred to as megalecithal. It's the characteristic of insects. Eggs having cytoplasm surrounding the distribution of the egg in the center, or centrolecithal eggs, are those. It's a property of insects.

571. Superficial meroblastic cleavage occurs in
(a) reptiles (b) birds
(c) mammals (d) insects
JCECE-2007

Ans. (d) : Arthropods that are centrolecithal show superficial cleavage. A meroblastic cleavage that combines mitosis and cytokinesis and causes an important amount of nuclei to go to the centrolecithal egg's periphery. Most inscet eggs undergo superficial cleavage.

572. Mosquito:
(a) Omnivores (b) Sanguivores
(c) Frugivores (d) Carrion Eater
Manipal-2002

Ans. (b) : Mosquito are sanguivors. Sanguivores are creatures who feed on or consume the blood of other creatures.
- Mosquito is a example of sanguivores. A frugivore is an animal that is heavily reliant on fruits.
- An Omnivores is an organism that routinely consumes a range of materials, including bears, birds, and even humans.

573. Cray fish is a
(a) crustacean animal (b) edible fish
(c) poisonous fish (d) None of the above
CG PMT-2005

Ans. (a) : Cray fish is a crustacean animal. The scientific term for crayfish, which are freshwater crustaceans and members of the group Astacidea, is Astacus.

@apna_pdf

574. The scientific name of the moth which produce tasar is

(a) Bombyx mori
(b) Antheraea mylitta
(c) Antheraea assamensis
(d) Philosomia ricini

MPPMT-2013
WB JEE-2011

Ans. (b) : The scientific name tasar silk is *Antherae mylitta*.
• Tasar in untamed, wild and forest based silk.

Silkmoth		**Common name**
Bombyx mori	–	Silk worm moth
Antheraea mylitta	–	Tasar silk worm
Antheraea assamensis	–	Muga silk worm
Philosamia ricini–		Erisilk worm

575. Mouth parts of housefly are:

(a) siphoning type
(b) sponging and sucking type
(c) biting and chewing
(d) piercing and sucking

DUMET-2006

Ans. (b) : The mouth parts of houseflies are sponging and sucking types. This type of mouthpiece is used for sucking up liquid or semiliquid food.

576. Which one of the following groups of three animals each is correctly matched with their are characteristic morphological feature?

(a)

Animal	Morphological feature
Scorpion, spider cockroach	Ventral solid central

(b)

Animal	Morphological feature
Cockroach, locust taneia	Metameric segmentation

(c)

Animal	Morphological feature
Liver fluke sea anymone	Bilateral symmetry

(d)

Animal	Morphological feature
Centipede, prawn sea urchin	Jointed appendages

(e)

Animal	Morphological feature
Hook worm, spider	Central nervous system

CMC Vellore-2015

Ans. (a) : The cockroach, spider, and scorpion have a ventral solid central nervous system. They are invertebrates and belong to the phylum Arthropoda. Thus, this is correctly matched. In Taenia, the body is with true segmentation. Taenia is a flat worms and does not exhibt metameric segmentation. Radial symmetry is present in sea anemones but liver fluke has bilateral sysmmmetry. Centipede and prawn have jointed appendages. The joint appendages are absent in sea urchins.

577. Which of the following animals is mostly used in genetics engineering ?

(a) Butterfly (b) Fruit fly
(c) Housefly (d) Dragonfly

DUMET-2005

Ans. (b) : Fruit fly is mostly used in genetics engineering. *Drosophila melanogaster* is known as the fruit fly. Genetic engineering is a branch of science that uses a set of biotechnology techniques to manipulate an organism's genome to create species with desirable traits

578. Cantharidin is obtained from:

(a) Red ants (b) Ball weevils
(c) Beetles (d) Honey bees

MP PMT-2013

Ans. (c) : Cantharidin is obtained from Beetles. It is a toxic monoterpene extracted from coleoptera beetles commonly known as **Spanish flies.**
• Cantharidin is a defensive secretion of meloid beetles.

579. Direction: In the given questions a statement of Assertion (A) is given and a corresponding statement of Reason (R) is given just below it of the statement, mark the correct answer as: Assertion : Compound eyes are found in many Arthropods.
Reason: Each compound eye consists of a large number of visual structures called ommatidia.

(a) If both (A) and (R) true and (R) is the correct explanation of (A)
(b) If both (A) and (R) are true but (R) is not correct explanation of (A)
(c) If (A) is true but (R) is false
(d) If both (A) and (R) are false
(e) If (A) is false but (R) is true

Haryana PMT-2001

Ans. (a): Since Arthropods eyes are composed of repeating components, termed ommatidia, each of which serves as a separate vision receptor, they are known as compound eyes.

580. Insects have:

(a) 3 pairs of legs (b) 4 pairs of legs
(c) 5 pairs of legs (d) None of these

J&K CET-2001
AFMC-2005

Ans. (a) : Insects have three pairs of legs, six legs, and two antennae, and their bodies are divided into three main parts: the head, thorax, and abdomen.

581. Oak silkwrom is :

(a) Antheraea roylei (b) Apis florea
(c) Bombyx mori (d) Clarias batrachus

BCECE-2001

Ans. (a) : *Antheraea roylei* is known as oak silkworm. This silkworm is raised in chain for its silk. It is non-mulberry silk. The caterpillar feed on the leaves of the oak plant.

582. Which is non-poisonous?

(a) Spider (b) Scorpion
(c) Centipede (d) Crab

CG PMT-2004

@apna_pdf

Ans. (d) : The crabs are not poisonous. Spiders are highly venomous, and a small amount of venom can cause serious illness. Scorpion species pass venom and use it to kill or paralyze their prey. Their venom consists of neurotoxins that affect the nervous system of prey. Centipedes are arthropods. Venom is produced by a gland at the base of the fangs. Venom includes chemicals that cause allergic reactions; they have cardio-depressant toxin-S.

583. In honey which of the following sugar is present?
(a) Glucose (b) Glycogen
(c) Sucrose (d) Cellulose

Haryana PMT-2000

Ans. (a) : Honey is approximately 40% fructose, 30% glucose and 17% water with the remaining being other sugar, carbohydrates and a small amount of vitamins and minerals.

584. Haemocoel is found in
(a) Hydra and Aurelia
(b) Taenia and Ascaris
(c) Cockroach and Pila
(d) Balanoglossus and Herdmania

Manipal-2008

Ans. (c) : The animals belonging to phylum Arthropoda and Mollusca have haemocoel. True coelome is present in which blood is filled. Cockroach belongs to the phylum Arthropoda while Pila is a Mollusca animal.

585. Which of the following taxonomic category of housefly is wrongly matched ?
(a) Genus – Musca
(b) Family – Muscidae
(c) Order – Primata
(d) Class – Insecta
(e) Phylum – Arthropoda

Kerala PMT-2013

Ans. (c) :
Phylum – Arthropoda
Class – Insecta
Order – Diptera
Family – Muscide
Genus – Musca

586. Complete metamorphosis is found in:
(a) house-fly and mosquito
(b) house-fly and cockroach
(c) mosquito and cockroach
(d) none of the above

Rajasthan PMT-2005

Ans. (a) : Complete metamorphosis is found in house-fly and mosquito both housefly and mosquito come under order Diptera of class Insecta, such as beetles, bees, ants, butterflies, moths, flies and mosquitoes.

587. What is true about Nereis, Scorpion, Cockroach and Silver fish ?
(a) They all belong to the same phylum
(b) They all have jointed paired appendages
(c) They all possess dorsal heart
(d) None of them is aquatic

AIPMT-2007

Ans. (c) : All invertebrates possess dorsal heart. Nereis is a member of the phylum Annelida's and Scorpions, cockroaches, and silverfish is members of the phylum Arthropoda. they all are invertebrates.

588. Which one of the following pairs is mismatched?
(a) Bombyx mori – Silk
(b) Pila globosa – Pearl
(c) Apis indica – Honey
(d) Kerria lacca – Lac

AIPMT-2007

Ans. (b) : An aquatic gastropod Mollusca called *Pila globosa* is a kind of freshwater snail with an operculum.
• *Bombyx mori,* produces a larvae or caterpillar known as the silkworm. Being the main producer of silk, it is an insect of significant economic importance.
• The Asian honeybee, *Apis indica*, is a subspecies of the Indian honeybee.
• The family Kerridae, also known as the lac insects, includes the insect species *Kerria lacca*.

589. A dorsal horn is present on the ..... of mulberry silk worm (caterpillar).
(a) 8th abdominal segment
(b) 5th abdominal segment
(c) 2nd thoracic segment
(d) Head

Karnataka CET-2009
Manipur-2009

Ans. (a) : The Arthropoda class includes the silkworm. The abdomen of the body has various sections. 11 bodily segments make up the abdomen. On the eighth segment, there is a small dorsal horn and a row of spiracles on the lateral sides.

590. Which of the following have biting and chewing type of mouth parts?
(1) Cimex (2) Larvae of silk moth
(3) Larvae of butterfly (4) Grasshopper
(5) Tse-Tse fly
(a) 2, 4, 5 (b) 2, 5, 4
(c) 1, 2, 4 (d) 3, 4, 5

AP EAMCET-2007

Ans. (a) : Biting and chewing types of mouth parts are found in cockroaches, grasshoppers, locust termites, wasps, book and bird lice, larvae of silk moths, Tse-Tse flies, etc. The mouthparts are developed to suit its habit of feeding on solid food, and as a result, it has well-developed mandibles.

591. Match the following

List I		List II
(A) Green glands	**1.**	**Scolopendra**
(B) Amphids and phasmids	**2.**	**Respiratory organ**
(C) Ctenidia	**3.**	**Shell protein**
(D) Poison claw	**4.**	**Excretory organs**
(E) Concholin	**5.**	**Sense organs**

@apna_pdf

The correct match is

	A	B	C	D	E
(a)	4	5	2	1	3
(b)	1	3	4	5	2
(c)	2	4	5	3	1
(d)	3	4	5	2	1

AP EAMCET-2009

Ans. (a) :

	List I		List II
(A)	Green glands	-	Excretory organs
(B)	Amphids and Phasmid	-	Sense organs
(C)	Ctenidia	-	Respiratory organ.
(D)	Poison Claw	-	Scolopendra
(E)	Concholin	-	Shell protein

592. Bombykol or gyplure is a

(a) drug (b) hormone
(c) antibiotic (d) pheromone

AMU-2007

Ans. (d) : Bombykol or gyplure is a **pheromone.** Pheromone are substances that insects and other animals use to communicate. Female silkworm moths use them to draw in males, for example, these chemical signals are sent by insects to either find food or attract partners. For instance, the natural silk moths of the species *Bombyx mandarina* employ the chemical bombykol.

593. In the life cycle of mosquito, comma-shaped stage is

(a) larval stage (b) pupal stage
(c) imago stage (d) None of these

Uttarakhand PMT-2008
Manipal-2008
BVP-2012

Ans. (b) : In the life cycle of mosquito, comma shaped stage is **pupal stage**. It is the third stage of the life cycle of mosquitoes. Pupal transfer into adult flying mosquitoes and lay their eggs within water filled containers.

594. Match the following with reference to eye of insect

	List-I		List-II
(A)	**Apposition image**	**(I)**	**Secrete crystalline cone**
(B)	**Dioptrical region**	**(II)**	**Refractive region of an ommatidium**
(C)	**Retinulae**	**(III)**	**Region having cornea and crystalline cone**
(D)	**Vitrella**	**(IV)**	**Houseflies**
(E)	**Cornea**	**(V)**	**Photoreceptor cells**

The correct match is

(a) A-V, B-IV, C-III, D-I, E-II
(b) A-IV, B-III, C-V, D-I, E-II
(c) A-III, B-II, C-IV, D-V, E-I
(d) A-IV, B-V, C-III, D-II, E-I

TS EAMCET-2015

Ans. (b) :

List-I	List-II
Apposition image	Houseflies
Dioptrical region	Region having cornea and crystalline cone
Retinulae	Photoreceptor cells
Vitrella	Secrete crystalline cone
Cornea	Refractive region of an ommatidium

595. Entomology is concerned with the study of:

(a) Agricultural practices
(b) Formation and properties of soil
(c) Various aspects of insects
(d) Various aspects of human life

Karnataka CET-2005

Ans. (c) : Entomology is a branch of biology that deals with the study of various aspects of insects. There are many branches of entomology, like apiculture, acarology, applied entomology, etc.

596. Which of the following features is not present in the Phylum - Arthropoda

(a) Jointed appendages
(b) Chitinous exoskeleton
(c) Metameric segmentation
(d) Parapodia

NEET-2016 Phase-I

Ans. (d) : Parapodia is a characteristic of Annelida, which is not present in the phylum-Arthropoda.
Arthropoda are bilaterally symmetrical, triploblastic, matameric segmentation and coelomate animals, The body of arthropods is covered by chitinous exoskeleton.

597. Bilateral symmetry, metameric segmentation, coelom and open circulatory system are the features of

(a) Annelida (b) Arthropoda
(c) Mollusca (d) Echinodermata

JIPMER-2012

Ans. (b) : The members of phylum - Arthropoda show bilateral symmetry, three germ layers in body wall, external metamerism, jointed and paired appendages, haemocoel and open type of circulatory system with dorsal heart.

598. The endocrine gland of insects, which secretes the juvenile hormone, is

(a) corpora albicans (b) corpora allata
(c) corpora myecaena (d) all of these

AIIMS-1997

Ans. (b) : The endocrine gland of insects that secretes the juvenile hormone is the corpora allata. Juvenile hormone inhibits metamorphosis in insects which produced by corpora allata, which are a pair of small gland located behind brain.
Corpora albicans and corpora myecaena are not endocrine glands.

@apna_pdf

599. Assertion (A) : Daphnia populations in a water body, at different seasons of an year showed market variations in their body morphology
Reason (R): Cyclomorphosis in some planktonic organisms is influenced by the variations in temperatures prevailing in their water bodies at different seasons.
(a) Both (A) and (R) are true and (R) explains (A)
(b) Both (A) and (R) are true but (R) cannot explain (A)
(c) Only (A) is correct but not (R)
(d) Both (A) and (R) are wrong

AP EAMCET-2007

Ans. (a) :
• Daphnia, a genus of small planktonic crustacean
• Cyclomorphosis (cyclic change in morphology) is the occurrence of seasonal changes in the phenotype of an organism through successive generations. It occurs in small aquatic invertebrates like Daphnia. Here Cyclomorphosis is influenced by the variations in temperature prevailing in the water bodies at different seasons.
The morphology depend upon the temperature variation in water. So, at different seasons of the year the Daphnia shows different morphology.

600. The organs that assist in sound production in mosquito are
(a) Hairy appendages (b) Mouth parts
(c) Hemielytra (d) Halters

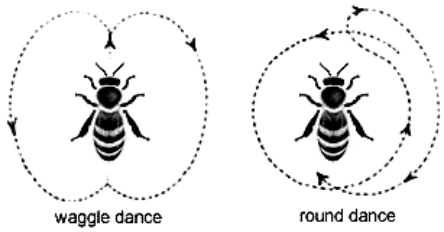
AP EAMCET-2007

Ans. (d) : In flies and mosquito , metathorax bears a pair of small drumstick shaped or club shapeded processes called halters or balancers.
Halters help balancing and improve flight. They are flapped rapidly and work as gyroscopes, telling the insect about its body position during flight. Every vibrating object tends to maintains its plane of vibration, a result of the carioles effects.

601. Which statement is correct:
(a) Apis indica is largest wild honey bee
(b) Wax is waste material of honey bee
(c) K.V. Fritsch discovered the transmission methods in honey bee
(d) Drone of honey bee is diploid

AIPMT-2000

Ans. (c) : Karl Von Fritsch (1967) discovered the transmission methods in the honey bee. He found that viruses can be transmitted between bees through direct contact: He also found that viruses can be transmitted from the queen bee to her offspring.
The largest wild honey bee is Apis dorsata laboriasa.
Drones of honey bee are haploid.
He observed the dance language used by honey bees to communicate the location of food sources.

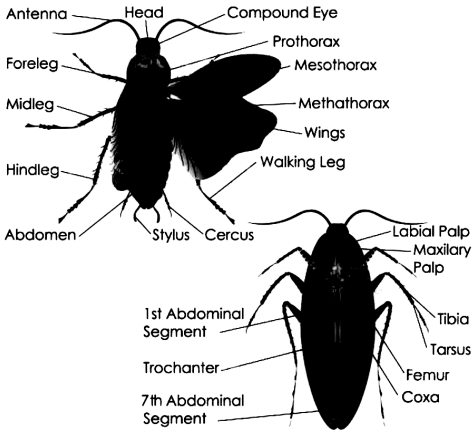


• **Drones of the honey bee are haploid**.

602. Select the correct statement from the ones given below with respect to Periplaneta Americana:
(a) There are 16 very long Malpighian tubules present at the junctions of midgut and hindgut/
(b) Grinding of food is carried out only by the mouth parts
(c) Nervous system located dorsally, consists of segmentally arranged ganglia joined by a pair of longitudinal connectives
(d) Males bear a pair of short thread like anal styles

AIPMT (Screening)-2012

Ans. (d) :



In male cockroach, from the sides of the 9th sternum, there arises, a paired, small unjointed outgrowth called anal styles.
• These are structure sensitive to touch.
• These are absent in female cockroach.
• Nervous system is located ventrally. There are 100 – 150 Malpighian tubules.
• Grinding of food is carried out by mouth parts and Gizzard.

603. Which one of the following is one of the paths followed by air/O_2 during respiration in an adult male *Periplaneta americana* as it enters the animal body?
(a) Hypopharynx, mouth, pharynx, trachea, tissues
(b) Spiracle in metathorax, trachea, tracheoles, oxygen diffuses into cells

@apna_pdf

(c) Mouth, bronchial tube, trachea, oxygen enters cells
(d) Spiracles in prothorax, tracheoles, trachea, oxygen diffuses into cells

NEET (Karnataka)-2013

Ans. (b) : The number of spiracles in cockroach having 10-pairs (2-pairs in thoracic and 8-pairs in abdominal region). In periplaneta Americana respiration takes place by spiracles.

- The thoracic pairs of spiracles are present on pleuron between prothorax – mesothorax and metathorax. Each spiracle open into a chamber called atrium. After atrium the tracheal tube ramifies into fine branches of tracheae, and then tracheoles.

604. Select the correct option with respect to cockroaches

(a) The fore wings are tegmina which are used in flight
(b) Malpighian tubules convert nitrogenous wastes into urea
(c) Males bear short anal styles not present in females
(d) Nervous system comprises of a dorsal nerve cord and ten pairs of ganglion

NEET (Karnataka)-2013

Ans. (c) : In cockroaches, male have paired anal styles on 9th abdominal sternite, which are absent in females. It helps in holding female during copulation.

Fore wings (Mesothorasic) called tegmina are opague dark and leathery and cover the hind wings when at rest.

The hind wings are transparent, membranous and are used in flight.

- Malpighian tubules are main excretory organs which extract nitrogenous wastes and water from haemolymph and reabsorb certain salts, forming Uric acid crystals.
- Nervous system comprises of a ventral nerve cord and 10 pairs of ganglia. Forewings are highly sclerotised and are not used in flight purpose. They are used to protect the hindwings at rest.

605. Life span of worker Honey Bee

(a) 30 days (b) 15 days
(c) 45 days (d) 10 days

AIPMT-1999

Ans. (c) : The life span of worker honey bee is 45 days. When honey production is in full swing, worker honey bees only live for six weeks while they gather food, store nectar, feed larvae and produce honey.

606. Which one of the following have the highest number of species in nature

(a) Angiosperms (b) Fungi
(c) Insects (d) Birds

AIPMT (Screening)-2011

Ans. (c) : The all over insect species in world near about 5.5 million. Beetles belong to coleopteran insect order in which there are approximately 350,000 identified species.

607. Which fish selectively feed on larva of mosquito–

(a) Gambusia (b) Rohu
(c) Clarias (d) Exocoetus

AIPMT-2001

Ans. (a) : Gambusia affinis is regarded as a larvicidal fish as it selectively feeds on mosquito larva. It forms an effective tool for biological control of mosquitoes.

Their diet consists of Zooplankton, small insects and insect larvae, and detritus material. Gambusia feed on mosquito larvae at all stages of life.

608. Statement Biting and chewing mouth parts are the most primitive type of mouth parts in insects.

Reason Holometabolus insects have biting and chewing type of mouth parts in their larvae.

(a) Both Statement and Reason are correct and Reason is the correct explanation of Statement
(b) Both Statement and Reason are correct but Reason is not the correct explanation of Statement
(c) Statement is correct but Reason is wrong
(d) Statement is wrong but Reason is correct

AP EAMCET-2010

Ans. (b) : The Chewing type is considered the most basic one, since, it is common in many free living species (beet, ants etc) and consist of a large mandible and a pair of separate maxillae II (**i.e. labium**) Both type of maxillae, serve to push (he minced food partical into the mouth).

609. Which one of the following arthropods is viviparous?

(a) Palaemon (b) Palamnaeus
(c) Pediculus (d) Peripianeta

AP EAMCET-2010

Ans. (b) : The Scorpion are the oldest known terrestrial arthopods, about 800 Species have been describe some common genera are Palamnaeus are viviparous and the female carry the young one on thier back for some time.

Palaemon – Palaemon is probably **paraphyletic**. Palaemon **serratus** is a typical prawn with a cylindrical body composed of a carapace at the front and six abdominal segments, it is oviparous.

Pediculus – Pediculus is wingless and white to gray and long, dorsoventrally flattened segmented abdomen. It has 3 pairs of clawed leg. It is oviparous.

Periplaneta – The Periplaneta is largest species of common cockroach, and often considered a pest. It is also known as the **ship cockroach**. It is oviparous.

@apna_pdf

610. The larval stage of a harmful insect causing a cavity like pathological condition in human subcutaneous tissue is

(a) naiad (b) nymph
(c) maggot (d) wriggler

AP EAMCET-2008

Ans. (c) : Maggots or gentles are common name for the headless and legless fly larvae. Within human subcutaneous tissue, it results in a diseased state resembling a cavity.

611. Assertion (A): Super position images are formed in the nocturnal insects.

Reason (R): The retinulae lie immediately below the vitrellae and crystalline cone, these are surrounded by retinal sheath, which absorb the light rays hence, super position images are formed in nocturnal insects.

The correct answer is

(a) both (A) and (R) are true and (R) explains (A).
(b) both (A) and (R) are true but (R) cannot explains (A).
(c) only (A) is correct but (R) is wrong
(d) both (A) and (R) are wrong

AP EAMCET-2008

Ans. (c): The compound eye of cockroach (nocturnal insect) forms super position image. It is blue-red image and is due to overlapping of image.

612. Assertion (A) : Arthropoda are the most successful of all the known animal groups.

Reason (R) : Arthropoda exhibits the greatest adaptive radiation and have adapted to diverse habitats.

(a) both (A) and (R) are true and (R) explains (A).
(b) both (A) and (R) are true but (R) cannot explains (A).
(c) only (A) is correct but (R) is wrong
(d) both (A) and (R) are wrong

AP EAMCET-2008

Ans. (a) : Arthropoda are the most successful biological group of animals because they are the most diverse and live in greater range of habitats than do the member of any other phylum of animals. They have chitinous exoskeleton that protects the body.

613. Study the following

(A) It is a terrestrial arthropod.
(B) The prosoma bears a pair of chelicerae, a pair of the pedipalps and four pairs of walking legs
(C) The metasoma ends in a telson.
(D) First pair of walking legs are modified as poisonous claws.

Which of the above are true for heterometrus?

(a) A and C (b) A and B
(c) A and D (d) C and D

AP EAMCET-2008

Ans. (b) : Heterometrus (Giant forest scorpion) is a terrestrial arthopods. Its prosoma bear a pair of chelicerae, a pair of pedipalps and four pair of walking legs.

614. How do you differentiate a butterfly from a moth?

(a) Moth has one pair of wings but butterfly has two pairs of wings.
(b) Moth has feathery antennae but butterfly has club shaped antennae.
(c) Moth has simple eyes but butterfly has compound eyes.
(d) Moth is diurnal but butterfly is nocturnal.

Karnataka CET-2010

Ans. (b) : Butterflies tend to fold their wings vertically up over their back. Moths tends to fold their wing in a tent–like fashion that hide the abdomen. Butterflies are typically larger and have more colorful patterns on their wing. Moth are typically smaller with darb–colored wings.

615. In the insect which feeds on nectar the proboscis of formed by:

(a) Hypopharynx (b) Mandibles
(c) Glossa (d) Labrium

AP EAMCET-2005

Ans. (c): The insect which feeds on nectar the proboscis is formed by glossa. It is used for the gathering of honey. It is an organ of touch and taste.

616. The main excretory organ of prawn is:

(a) Green gland (b) Flame cell
(c) Malpighian tubule (d) Nephridia

AP EAMCET-2005

Ans. (a) : The main excretory organs of Prawn are paired green gland. They are located within the second antennae which are the second pair of appendages attached to the anterior part of the body. Each green gland consists of an end sac labyrinth and a bladder.

- **A flame cell** is a specialized excretory cell found in the simplest freshwater invertebrates, including flatworms, rotifers and nemerteans; these are the simplest animals to have a dedicated excretory system.
- **Malpighian tubule** system is a type of excretory and osmoregulatory system found in some insects like cockroach.
- **Nephridia** are the excretory organs present in annelids such as earthworm, flatworms, cephalochordate, and rotifers contain protonephridia of flame cells for osmoregulation.

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617. Malpighian tubules are

(a) Excretory organs of insects
(b) Excretory organs of frog
(c) Respiratory organs of insects
(d) Endocrine glands of insects

JIPMER-2009

Ans. (a) : Malpighian tubules are the main osmoregulatory and excretory organs of insects and are considered analogous to the nephridia or kidneys, the corresponding organs of annelids and the vertebrates.

618. Class- Crustacea differs from Insecta in having

(a) two pairs of antennae
(b) jointed foot
(c) chitinous cuticle
(d) none of the above

UP CPMT-2005

Ans. (a) : Both crustaceans and insects are arthropods, which means they have a segmented body with a hard exoskeleton, jointed limbs and a chitinous cuticle.

Crustaceans have two pairs of antennae, while insects only have one pair.

Prawn, crab etc belong class crustacean while cockroach, grasshopper, bees belong insects.

619. Mandibles are absent in

(a) mosquito (b) housefly
(c) honeybee (d) butterfly

UP CPMT-2011

Ans. (b): Generally mandibles absent in houseflies. They have sponging mouth parts that are help in sucking up liquid or semi liquid food.

In mosquitoes, honeybees and butterflies have mandibles, which is essential for chewing food.

620. Which of the following belongs to class 1 Insecta?

(a) julus (b) silver fish
(c) lobsters (d) prawn

UP CPMT-2011

Ans. (b): • Silver fish belong to the phylum arthropoda because it is a type of insects silver fish are wingless insects mostly found in old books, newspaper etc.

• Julus is a type of millibede, which are not insects.

• Lobsters are crustaceans, which is an invertebrates.

• Prawn also belong class crustaceans.

621. Note the following

An insect whose mouth parts are biting and chewing type in the larval condition, while they are siphoning type in the adult and this insect gives an economically important substance during yet another stage of its development.

The insect is

(a) Anopheles (b) Laccifer
(c) Bombyx (d) Apis

AP EAMCET-2009

Ans. (c) : Bombyx- The caterpillar larvae of silkmoth (bombyx mori) are voracious feeder, so they have the continuous supply of food each caterpillar larvae has a mandibulate (biting and chewing) type of mouthparts adapted to feed easily on mulberry leaves while adult has siphoning type of mouth parts. Commercial silk is obtained from the cocoons of **Bombyx mori**.

Anopheles – Malaria is transmitted to humans by female mosquitoes of the genus **Anopheles**. Female mosquitoes take blood meals for egg production and these blood meals are the link between the human and the mosquito hosts in the parasite life cycle.

Laccifer – The **Indian lac insect Laccifer lacca** is important commercially. It is found in tropical or subtropical regions on banyan and other plants. The females are globular in form and live on twigs in cells of resin created by exudations of lac.

Apis – Apis mellifica is used for minor burns with an excessive amount of erythema, swelling and pain. The pain is relieved by the application of ice-cold compresses.

622. Which of the following is an insect ?

(a) Moth (b) Mites
(c) Prawn (d) scorpion

UP CPMT-2002

Ans. (a) : An insect is a small animal that has 6 legs. Most insects have six wings. Ants, moth, flies, butterflies all are insects. Mites are not real insect, they look like insect and belong to class arachnida.

623. Mouth part of mosquito is

(a) sucking and piercing type
(b) sponging type
(c) biting and chewing type
(d) None of the above

UP CPMT-2002

Ans. (a) : The piercing and sucking mouth parts are unusual features of the female mosquito

Sponging type- Found in Housefly and some other flies to suck up the liquefied food.

Biting and chewing type- This type mouth parts represent most primitive and unspecialised type which appeared in early insecets in course of evolution found in orthopteron insects ex. grasshoppers and Cockroches.

624. Scorpion belongs to a class which one of the following also belong?

(a) Ticks (b) Carbs
(c) Branicles (d) Cockroaches

BVP-2004

Ans. (a) : Scorpion and ticks belongs to class Arachnida of Phylum Arthropoda. they are short legged, round bodies mites. scorpions are with curled tails and have exoskeleton made of chitin Arachnida lack jaws and body divided into head, abdomen and cephalothorax Body show tergites & poison gland is present scorpion.

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I. Mollusca

625. In Mollusca, eye is present over a stalk, called
(a) ostracum (b) operculum
(c) ommatophores (d) osphradium
UP CPMT-2012, 2008, 2007 / VMMC-2012
BCECE-2010 / JIPMER-2009
Rajasthan PMT-2008 / CG PMT-2008

Ans. (c) : The ommatophores of crustaceans are called ophthalmites.
The eye stalk which is a protrusion extending the eye in mollusca away from the body is known as Ommatophore. It appears like a stumpy peduncle, on which eyes are located in molluscs. This is helpful in providing a better field of vision to the organisms such as snails (molluscs). Molluscs have eyes varying from simple structure to complexier ones.

626. Osphradium of Pila globosa is:
(a) photoreceptor (b) chemoreceptor
(c) thermoreceptor (d) tangoreceptor
Punjab MET-2011 / VMMC-2010
AP EAMCET-2005 / DU MET-2004
Manipal-2002 / AFMC-2002 / UP CPMT-2001

Ans. (b) : Osphradium of Pila globosa is a chemoreceptor. It helps to detect the chemical composition of water. It is located in the mantle cavity of the snail and is a small, finger. like structure osphradium has a patch of sensory cells which helpful in detection of food, avoiding predators and selection of suitable habitat.
- The retina contain sensitive cells called photoreceptors.
- Thermoreceptor responsible for changes in temperature.
- Tangoreceptor are stimulated by touch and pressure.

627. Connecting link between Annelida and Mollusca is
(a) Peripatus (b) Lepidosiren
(c) Neopilina (d) Protopterus
Uttarakhand PMT-2009 / VMMC-2009, 2011
DU MET-2004 / UP CPMT-2001

Ans. (c) : Neopilina is the connecting link between annelida and Mollusca.
- It has trochophore larva and has 5 to 6 pairs of ctenidia, 6 pairs of nephredia, 8 pairs of retracer muscles and 2 pairs of auricles like annelida.

628. Veliger larva occurs in phylum
(a) Mollusca (b) Echinodermata
(c) Arthropoda (d) Cnidaria
Punjab MET-2009 / Rajasthan PMT-2009
UP CPMT-2009 / DUMET-2001,2002

Ans. (a) : Veliger larva occurs in the phylum mollusca. It is a free-swimming larva.
- Veliger is the second stage of a larva of mollusks.

Echinoderm larva- Dipleurula, Bipinnaria brachiolaria larva, Doliolaria larva.

629. Correctly matched set of phylum, class and example is
(a) Protozoa-Mastigophora-Entamoeba
(b) Mollusca-Bivalvia-Pinctada
(c) Arthropoda-Diplopoda-Scolopendra
(d) Chordata-Cyclostomata-Phrynosoma
BCECE-2014 / BVP-2014, 2009 / VMMC-2009

Ans. (b) : Mollusca is the second largest phylum of animals the different class of it include class Bivalvia, gastropoda, scaphophoda and cephalopoda Pinctada is a genus of saltwater.

630. The generic name of tusk shell is:
(a) Dentalium (b) Chaetoderma
(c) Chiton (d) Neopuna
BVP-2005 / AMU-2005
Haryana PMT-2004 / Manipal-2003

Ans. (a) : Dentalium is a genus of phylum Mollusca commonly known as tusk shell. The common name is based on the tooth or tusk shaped form of the molluscs.
Tusk shells belongs to the class Scaphopoda, meaning "boat foot". Tusk shell are used to make belts, headdresses, necklaces etc.

631. Natural pearl belong to
(a) Arthropoda (b) Protozoa
(c) Mollusca (d) Echinodermata
UP CPMT-2003 / Punjab MET-2006
DUMET-2005 / Rajasthan PMT-2003

Ans. (c) : A pear is a hard object produced within the soft tissue specifically the mantle of a living shelled mollusk.
Pinctada or pearl oyster is the member of mollusca. Pinctada or the pearl oyster produces the best quality of the pearl. Mollusca is the second largest phylum of the animal kingdom.

632. Assertion (A): Adult gastropods are asymmetrical though there are included in phylum Mollusca.
Reason (R): Symmetry of organism is determined in early developmental stages but not in adults.
(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) A is correct but R is incorrect.
(d) A is incorrect but R is correct
AP EAPCET-23.05.2023, Shift-II

Ans. (c) : Adult gastropoda, which are a class of mollusks often exhibit asymmetry in their body structure this characteristic is most prominent in their shells which are usually cold and spiral-shaped the coiling of the shell creates an asymmetrical arrangement, where one side body is larger and more developed than other.
This asymmetry is defining feature of astropods and can very in degree across different species.

633. The larval form of gastropods is
(a) Veliger (b) Bipinnaria
(c) Parenchymula (d) Auricularia
TS EAMCET-11.05.2023, Shift-I

Ans. (a) : The larval form of gastropods is called "Veliger".
Veliger are typically free-swimming larvas that have a distinct appearance. They have small coiled shell or shell-like structure, and they often have ciliated band use for locomotion and feeding.
This larval stage allows gastropods to disperse in the water and colonize new areas before selling down and developing into their adult form.

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634. Choose the correct combination among the following

Class	Part	Function
A. Bivalvia	Radula	Rasping organ
B. scaphopoda	Captacula	Capture of food
C. Pelecypoda	Crystalline style	Digestion of starch
D. Cephalopoda	Osphradium	Water purity testing

(a) A, D (b) B, D
(c) A, C (d) B, C

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Chephalopds, which include squid, octopuses and cuttlefish, possess osphradia (Singular:Osphradium) which are sensory organs responsible for detecting water purity testing.
Osphradia are located in the matte cavity and play a role in various functions such as respiration and chemoreception, helping these animal to their environment.

635. Which of the following statements is correct in relation to molluscans?

(a) Internal shell is present in Aplysia and shell is absent in Doris
(b) Internal shell is present in Doris and absent in Aplysia
(c) Torsion is found in Unio
(d) Shell of octopus contains eight transverse plates

AP EAPCET-12.07.2022 Shift-I

Ans. (a) : In mollucans the internal shell is present in Aplysia and shell is absent in Doris. Aplacophor is small group of molluscus that are characterised by their lack of shell and worm like appearance.

636. The stomach of the animals of this class contains a crystalline style

(a) Scaphopoda (b) Pelecypoda
(c) Cephalopoda (d) Gastropoda

TS EAMCET-31.07.2022 Shift-I

Ans. (b) : Pelecypoda, is class of marine and fresh water molluscs that have laterally compressed body enclosed by a shell consisting of two hinged parts.
In this class-Buccal mass is without radula, subradula and odontophore. Alimentary canal is a coiled tube with crystalline style in the intestine.

637. Match the following related to adaptation in aquatic habitat?

List-I	List-II
i. Gelatinous cocoon	(A) Cartilaginous fishes
ii. Salty fluid that drips through nostrils	(B) Salmon
iii. Trimethyl amine oxide	(C) African lung fish
iv. Anadromous migration	(d) Penguins

A B C D
(a) (i-D), (ii-C), (iii-B), (iv-A)
(b) (i-C), (ii-D), (iii-A), (iv-B)
(c) (i-A), (ii-D), (iii-C), (iv-B)
(d) (i-A), (ii-B), (iii-D), (iv-C)

AP EAPCET-12.07.2022

Ans. (b) : The correct match–

List-I	List-II
Gelatinous cocoon	African lung fish
Salty fluid that drips through nostrils	Penguins
Trimethyl amine oxide	Cartilaginous fishes
Anadromous migration	Salmon

638. The triploblastic animals that exhibit asymmetry in adult stage are?

(a) Echinoderms (b) Cnidarians
(c) Sponges (d) Gastropods

TS EAMCET-10.08.2021 Shift-I

Ans. (d): Gastropods - Asymmetry, animal cannot be cut into equal halves by any plane. Gastropod larval stage is bilateral and adult is asymmetrical **Ex. Snail**.
• **Echinoderms-** Adult echinoderm (Star fish) shows redial symmetry and its larva shows bilateral symmetry.
• **Cnidarians-** Cnidarians shows radial symmetry.Their distinguishing feature is chidocytes, specialized cells that they use mainly for capturing prey.
• **Sponges-** Sponges shows asymmetrical symmetry and similar to other animals in that they are multicellular, heterotrophic, lack cell walls and produce sperm cells.

639. Correctly matched set of phylum, class and example is

(a) Protozoa–Mastigophora–Entamoeba
(b) Mollusca–Bivalvia–Pinctada
(c) Arthropods–Diplopoda–Scolopendra
(d) Chordata–Cyclostomata–Phrynosoma

JIPMER-2012
AP EAMCET03.092021 Shift-I

Ans. (b) : Pinctada species belongs to the phylum Mollusca, class-Bivalvia and subclass-Lamellibranechia. It is commonly known as pearl oysters.

640. Match the following:

Molluscs	Class
A Doris	I. Pelecypoda
B Architeuthis	II. Gastropoda
C. Pinctada	III. Scaphopoda
D. Dentalium	IV. Apoda
	V. Cephalopoda

The correct match is:

A B C D
(a) II V I III
(b) III I V II
(c) IV V III II
(d) II IV I III

TS EAMCET-28.09.2020 Shift-II

Ans. (a) :

	Mollusca	Class
A.	Doris	Gastropoda
B.	Architeuthis	Cephalopoda
C.	Pinctada	Pelecypoda
D.	Dentalium	Scaphopoda

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641. Match the following:

Mollusc	Class
(A) Neopilina	**I. Tetrabranchiata**
(B) Chiton	**II. Scaphopoda**
(C) Aplysia	**III. Monoplacophora**
(D) Pulsellum	**IV. Polyplacophora**
	V. Gastropoda

The correct match is
Options:

	A	B	C	D
(a)	II	V	IV	I
(b)	I	IV	V	II
(c)	III	II	V	IV
(d)	III	IV	V	II

TS EAMCET-28.09.2020 Shift-I

Ans. (d) :

	Mollusc	Class
(A)	Neopilina	Monoplacophora
(B)	Chiton	Polyplacophora
(C)	Aplysia	Gastropoda
(D)	Pulsellum	Scaphopoda

642. Match the following

List-I	List-II
A. Anadromous	**(I) Anguilla**
B. Catadromous	**(II) Protopterus**
C. Diapause	**(III) Lizards**
D. Aestivation	**(IV) Insects**
	(V) Hilsa

The correct match is

	A	B	C	D
(a)	V	I	IV	II
(b)	V	I	III	IV
(c)	II	IV	I	IV
(d)	III	II	I	IV

TS EAMCET-29.09.2020 Shift I

Ans. (a) : The correct match-

List-I	List-II
Anadromous	Hilsa
Catadromous	Anguilla
Diapause	Insects
Aestivation	Protopterus

643. Radula is a part of which animal.
(a) Mollusca (b) Poriferans
(c) Coelenterata (d) Annelida

JIPMER-2019

Ans. (a) : Radula is a part of Mollusca. In the mouth of members of phylum Mollusca contains a file-like rasping organ for feeding, called radula.
Radula is an organ present in pila that help to cut down the food using the teeth of the radula.

644. Most advanced invertebrates are
(a) Arthropoda (b) Annelida
(c) Mollusca (d) Cephalopoda

JIPMER-2019

Ans. (d) : Any member of the class cephalopoda of the phylum mollusca is highly advanced and exclusively marine animal.
Ex:- Octopus, Cuttlefish and Squid with large heads large eyes and grasping tentacles.

645. Which of the following are true about Mollusca?
(a) Triploblastic and radial symmetry
(b) Bilateral symmetry and calcareous shell
(c) Radula and diploblastic
(d) Calcareous shell and radial symmetry

AIIMS-26.05.2018 Shift-I

Ans. (b) : Mollusca are the second largest animal phylum. They are bilaterally symmetrical, triploblastic, coelomate animals. They have a $CaCO_3$(Calcareous) shell. Radula are specialized structure in mollusca for feeding.

646. Select the correct matching:

	Phylum	Character	Example
(a)	**Hemichordata**	**Notochord**	**Balanoglossus**
(b)	**Mollusca**	**Radula**	**Dentalium**
(c)	**Platyhelminthes**	**Coelomate**	**Dugesia**
(d)	**Coelenterata**	**All marine**	**Hydra**

AIIMS-26.05.2018 Shift-I

Ans. (b) : The radula is tile-like structure used by mollusca for feeding, sometimes compared to a tongue. Dentalium belongs to phylum Mollusca.
- Hemichordates consist of stomochord in the collar area instead of notochord. Stomochord is similar in structure to the notochord. Balanoglossus belongs to phylum Hemichordata
- Platyhelminthes have no circulatory system or body cavity (coelom). Ex- Dugesia, Planaria.
- Coelenterates are all aquatic mostly marine, some (fresh water) animals. Hydra belongs to phylum Coelenterata.

647. Torsion of visceral mass is seen in animals belonging to class
(a) Cephalopoda (b) Scaphopoda
(c) Amphineura (d) Gastropoda

JIPMER-2017

Ans. (d) : Gastropods transform the symmetric bodyplane into a highly asymmetric one through a unique process called torsion.
Torsion is about 180° rotation. Although the oneset of torsion and its completion are readly observed in several species.

648. Ctenidia are the respiratory organs of the following
(a) Arthropoda (b) Annelida
(c) Mollusca (d) Porifera

TS EAMCET-12.05.2017

Ans. (c) : Ctenidia are the respiratory organs of mollusks. They are specialized structures that help mollusks like clams, mussels, and snails extract oxygen from water and eliminate carbon dioxide.

649. Moti is formed from
(a) Limulus (b) Palaemon
(c) Pinctada (d) Plasmodium

VMMC-2010, 2011

Ans. (c) : Pinctada is also known as "mother of pearl".
Pearls are formed when the molluscs start to secrete a lot of very thin concentric layers of nacre, a secretion of carbonate during a matrix that can coat an irritant, either artificial or natural.
Pearl is also known as moti. It's white, highly shining, a globular natural material found within the shell of an oyester which is a mollusca.

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650. Radula is found in

(a) Pila sp. (b) Chiton sp.
(c) Lamellidens sp. (d) Pinctada sp.

WB JEE-2010 / BCECE-2012

Ans. (a) : The radula is feeding organ of molluscs. It is a minutely toothed, chitinous ribbon, which is used for scraping or cutting food before food enters into the oesophagus.

651. Which of the following have eye structure nearest to that of vertebrates?

(a) Insecta (b) Polychaeta
(c) Cephalopoda (d) Crustacea

AFMC-2000

Ans. (c) : Cephalopod molluscs (Squid, octopus, cuttlefish) possess a well develop nervous system and are highly intelligent. The complex eye of cephalopod molluscs and vertebrates have been considered a classical example of convergent evolution.

- Cephalopods have averted retinae with the rhabdomeric photoreceptors pointing towards the light in contrast to the inverted retinae with ciliary photoreceptors in vertebrates.

652. Which of the following belongs to class – polyplacophora?

(a) Chiton (b) Patella
(c) Pila (d) Murex

AMU-2015

Ans. (a) : Chitons are the only members of the class polyplacophora which is belong to the class of mollusca. chiton are marine mollusks with eight over lapping shell plates.

- Pila, patella and Murex belong to class gastropods.

653. Largest invertebrate is:

(a) Little fish (b) Ship worm
(c) Devil fish (d) Giant squid

Rajasthan PMT-1996 / AFMC-2004

Ans. (d) : The giant squid, is the largest invertebrates which is a deep-sea creature that can grow up to 13 meters (42 feet) long. It is the largest known invertebrates in the world.

- They belong to class Cephalopoda of phylum Mollusca.
- They are found in all the oceans of the world.
- Giant squid - the giant squid is a species of deep ocean dwelling squid in the family architeuthidae.

654.Which one is Devil fish?

(a) Rhinobates (b) Octopus
(c) Sepia (d) Giant squid

Rajasthan PMT-1996

Ans. (b) : Devilfish is the common name of Octopus. In earlier times, its morphology and external appearance was considered to be evil by men in fishing boats Though it shares gills and aquatic habitat with fishes, octopus is not a fish. It comes under the phylum Mollusca.

655. Which of the following belongs to the class Amphineura ?

(a) Chiton (b) Nautilus
(c) Dentalium (d) Pinctada

Manipal-2004
AMU-2005

Ans. (a) : The class Amphineura is a class of marine mollusks that have a shell made up of eight overlapping plates. Chiton belong to class Amphineura. Class amphineura divided into two sub classess.

- Polyplacophora (Chitons)
- Aplacophora (Shell less Chitons).

Dentalium belong to class scaphopoda phylum mollusca. Nautilus belong to class cephalopoda phylum Mollusca. Pinctada (Pearl oyster) is a marine mollusk belong to class Bivalvia.

656. The study of molluscan is called :

(a) Nerology (b) Conchology
(c) Malacology (d) Craniology

AMU-2005 / Manipal-2004
Uttarakhand PMT-2004

Ans. (c) : Malacology is the branch of zoology, which mainly takes up the study of molluscs. Molluscs involve snails and slugs, clams, octopuses and squid.

- Conchology is the study of molluscs shells.
- Neurology is the branch of science in which study of brain (specially neurons)
- Craniology is the study of human skull.

657. Which of the following classes do not belong to phylum Mollusca?

(a) Monoplacophora (b) Gastropoda
(c) Trematoda (d) Pelecypoda

JIPMER-1998

Ans. (c) : Trematoda is a class of parasitic flatworms that belong to the phylum platyhelminthes. Trematoda also known as flukes. It is obligate internal parasites, means they cannot survive outside of a host.

Mollusks are separate phylum of animals that includes snails, clams and octopuses.

Classes-Monoplacophora, Gastropoda and Pelecypoda are belong to phylum mollusks.

658. Phylum Mollusca can be distinguished from other invertebrates by the presence of

(a) bilateral symmetry and exoskeleton
(b) a mantle and gills
(c) shell and non-segmented body
(d) a mantle and non-segmented body

DUMET-2010 / Rajasthan PMT-1998

Ans. (d) : Mollusca can be distinguished from other invertebrates by the presence of a mantle and non-segmented body.

All mollusks contain three main features such as a redulla, A mantle and A foot (for locomotion).

Bivalve mollusks (such as clams and oysters) do not have redulla.

659. Glochidium larva is absent in

(a) Unio (b) Pinctada
(c) Sepia (d) None of these

UP CPMT-2012

Ans. (c) : The Glochidium is a microsporic larval stage of some freshwater mussels, aquatic bivalve. The Glochidium larva absent in sepia belong to class cephalopoda family mollusca.

660. The second largest number of species containing phylum in the animal kingdom is

(a) Annelida (b) Arthropoda
(c) Mollusca (d) Chordata

J&K CET-2009

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Ans. (c) : The largest number of species containing phylum is Arthropoda.
- The second largest number of species containing phylum in the animal kingdom is Mollusca.
- The phylum mollusca are the largest marine phylum and they are among the most diverse organisms of earth.
- The phylum Mollusca generally contains organisms like snails, squids, clams, oysters, octopuses etc in them.
- The organism of this phylum is also used for an ornamental purpose by humans.

661. The presence of the blood pigment haemocyanin is a characteristic of the following
(a) Asterias and Taenia
(b) Fasciola and Cockroach
(c) Pila and Pheretima
(d) Pila and Carcinus

JIPMER-1997

Ans. (d) : Hemocyanin is copper-containing respiratory pigments found in many mollusks (some bivalves, many gastropods and cephalopods) and arthropods (many crustaceans, some arachnids and the horseshoe crab silimulus). They are colorless when deoxygenated but turn blue on oxygenation.
- Pila and carcinus contain blue blood pigment haemocyanin.
- Cockroaches have hemolymph (colorless blood).
- Asterias also have no respiratory pigment in blood.

662. Which of the following belongs to the class-Gastropoda?
(a) Clam (b) Cuttle fish
(c) Snail (d) Mussel

J&K CET-2012

Ans. (c) : Cephalopods are group of molluscs that include the pearly chambered Nautilus, octopus and the squids. Snail belongs to the class Gastropoda.
Snail is an amphibious mollusc commonly found in ponds, rivers and rice fields. They are herbivorous animal feed mainly on grasses and phytoplankton.
The class Gastropoda (in phylum Mollusca) includes the groups pertaining to snails and slugs. The majority of gastropods have a single, usually spirally, coiled shell into which the body can be withdrawn.
- Gastropoda is the largest class of molluscs comprising over 80% of all molluscs.

663. Correct member of the phyla is :
(a) Arthropoda -Arachnida - Lobstar
(b) Arthropoda - Myriapoda - Scorpion
(c) Mollusca - Cephalopoda - Octopus
(d) Mollusca - Gastropoda - Squid

Rajasthan PMT-1998

Ans. (c) : The Phyla Arthropoda and Mollusca both are large group of animals. Mollusca is the second largest phylum in the phyla group.
- Arthropoda are characterized by their jointed limbs, while mollusks are characterized by their soft bodies and hard cells.
- Gastropoda another class of Mollusca and includes snails and slugs.
- Lobster belong to class crustacea of phyum Arthropoda.
- Myriapoda is a subphylum of arthropoda phylum.

664. Trochophore is the larva of :
(a) Neopilina (b) Chiton
(c) Pila (d) All of these

MGIMS Wardha-2005 / UP CPMT-2005

Ans. (d) : Trachophore is the larva of phylum Annelida and most groups of mollusk. It is small, free swimming larva with a ring of cilia around the head that helps it to swim, it included Neopilina, Pila and Chiton etc.
- Neopilina, chiton and pila belong to phylum Mollusca. Molluscan development is either direct with metamorphosis through the trachophore stage.

665. The phenomenon of torsion occurs in
(a) Gastropoda (b) Pelecypoda
(c) Cephalopoda (d) Amphineura

AMU-2010

Ans. (a) : Early in the development of the gastropods, one of the most important changes to the molluscan body morphology takes place. It is torsion which is a gastropod synapomorphy which occurs in all gastropods during larval development. Torsion is the rotation of the visceral mass, mantle and shell 180° with respect to the head and foot of the gastropd which brings the mantle cavity and anus to an anterior position.

666. The excretory material of bony fish is
(a) urea (b) protein
(c) ammonia (d) amino acid

UP CPMT-2008

Ans. (c) : In bony fishes, ammonia is excretory material because it is very toxic substance to tissues but extremely soluble in water.
- In aquatic animals, this mode of excretion is preferred. Ammonotelic excretion, is the process by which ammonia is excreted

667. Which of the following pair is correct:
(a) Protozoa – Hydra
(b) Arthropoda – Crustacea - cockroach
(c) Mollusca – Cephalopoda - Octopus
(d) Annelide – Polychaeta - leech

Manipal-2000

Ans. (c) : Phylum mollusca is the second largest animal phylum. cephalopoda or 'head foot' is a class of phylum mollusca.
- Cockroach belong to class insecta of phylum Arthropoda.
- Leech belong to class clitellata of phylum Annelide.
- Hydra belong to phylum Coelenterata (Cnidaria)

668. Who is referred to as father of pearl industry ?
(a) Lwanovsky (b) Louis Pasteur
(c) Kokichi Mikimoto (d) Harvey

CG PMT-2007, 2004

Ans. (c) : Kokichi Mikimoto, (1858-1954) a japanese entrepreneur is considered as the father of Modern Pearl industry.
He is also considered as the 'Pearl king'. From the initial success the technique of pearl culture was developed and perfected.

669. Ink glands are found in
(a) sponge (b) star fish
(c) sepia (d) jellyfish

CG PMT-2009

Ans. (c) : There is the presence of a sac-like gland in cephalopods which is known as ink sac.
Sepia (cuttlefish) contains a large ink gland which opens into the rectum.

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670. Pearls are produced by the animals of phylum
(a) Annelida (b) Arthropoda
(c) Mollusca (d) Echinodermata
CG PMT-2009

Ans. (c) : Animal producing natural pearls belongs to phylum Mollusca.
Mollusca is the second largest phylum of the animal kingdom.
Pearl is produced by marine mulluscs such as pearl oyster and mussel.

671. What is the name of class to which pearl oyster belongs?
(a) Cephalopoda (b) Pelecypoda
(c) Gastropoda (d) Scapoda
JIPMER-2000

Ans. (b) : Pearl oysters belong to the class pelecypoda. Pearl oysters are bivalve mollusks, which means they have two shells that are hinged together. Pelecypoda included clams, mussels and scallops.

672. Cuttle fish belongs to phylum:
(a) Mollusca (b) Protozoa
(c) Pisces (d) Chordata
JIPMER-1995

Ans. (a) : Cuttle fish or Cuttles are Marine Molluscs of the Phyllum Mollusca, class Cephalopoda, Kingdom of animalia and order sepiida. The Cuttle fish are triploblastic and coelomate. The body is divided into the mantle, foot and shell.

673. Which of the following animal belongs to the phylum-Mollusca ?
(a) Devil fish (b) Dog fish
(c) Silver fish (d) Jelly fish
AMU-2012
CG PMT-2010

Ans. (a) • Devil fish belong to phylum mollusca. It is a common name of octopus, Sometimes it is called the Devil Fish due to the appearance of it.
• Jelly fish belong to phylum Cnidaria or Coelenterata.
• Silver fish belong to phylum Arthropoda.
• Dog fish is the common name for scoliodon. They are a type of shark which is a cartilaginous fish under class chondrichthyes of phylum chordata.

674. Molluscan blood contains
(a) Haemoglobin (b) Haemozoin
(c) Haemocyanin (d) All of these
MGIMS Wardha-2011

Ans. (c) : Molluscan blood contain haemocyanin. Most of the molluscan are coelomate. Haemocyanin pigment is found as molluscs. Haemocyanin is rich in copper & haemoglobin is rich in iron. Due to this reason, organisms with hemocyanin in their blood have blue colour blood

675. Select the animal which has the following features is their body
(I) Marine habitat.
(II) Bilateral symmetry and cephalisation.
(III) Haemocoel as principal body cavity.
(IV) Eyes similar to that of vertebrates.
(a) silver fish (b) dog fish
(c) cuttle fish (d) jelly fish
BVP-2015
AP ERAMCET-2010

Ans. (c) : Cuttle fish (Sepia officinalis) are marine animal and shows bilateral symmetry which belongs to order-Sepiida and class-Cephalopods and phylum-Mollusca.
• Cuttle fish is also said to have one of the largest brain-to-body rations of any invertebrate and show cephalisation. The eyes of cuttle fish are similar to the eyes of vertebrates.

676. Which one of the following is a molluscan larva:
(a) lovens larva (b) veliger
(c) parenchymula (d) bipinnaria
AP EAMCET-2000

Ans. (b) : Veliger, larva typical of certain mollusks such as marine snails and bivalves and a few freshwater bivalves. The veliger develops from the trochophore larva and has large, ciliated lobes (velum). The velum forms from the ciliary ring (Prototroch), a characteristic of the trochophore stage.

677. A cephalopod without a shell:
(a) Sepia (b) Loligo
(c) Octopus (d) Nautilus
AP EAMCET-2015, 1999

Ans. (c) : Cuttle fish have a hard internal shell-like structure called a cattle bone and squid have a more flexible internal structure called a pen, both of which are used for internal support. Octopuses have no shell-like structure at all.

678. Shell of molluscs is produced by its
(a) Radula (b) Thorax
(c) Mantle (d) Abdomen
HP CET-2012 / AMU-2002

Ans. (c) : The shell of mollusks is produced by its mantle parts.

679. The biological name of feather star is
(a) Ophiothrix (b) Antedon
(c) Petaceros (d) Clypeaster
Haryana PMT-2011

Ans. (b) : The biological name of feather star is Antedon. Feather stars look like flowers. They have heart, eyes and brain.
• Feather stars eat with their feet. They have sticky mucus that helps them catech their microscopic prey before flinging into their mouths.
Feather stars belong to the class *Crinodiea* and phylum *Echinodermata* along with other marine creatures such as sea stars and sea urchins.

680. Amphineuran mollusc is
(a) Chiton (b) Nautilus
(c) Dentalium (d) None of these
Haryana PMT-2011

Ans. (a) : Chitons are marine mollusks of varying size in the class polyplacophora formerly known as Amphineura. About extant and fossile species are recognized.
• Members of class polyplacophora are better known as "Chitons".

681. Which one of the following is a matching set of a phylum and its three examples?
(a) Cnidaria - Bonellia, Physalia, Aurelia
(b) Platyhelminthes - Planaria, Schistosoma, Enterobius

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(c) Mllusca - Loligo, Teredo, Octopus
(d) Porifera - Spongilla, Euplectella, Pennatula

JCECE-2015 / BHU PMT (Mains)-2010
AIPMT-2006

Ans. (c) : Loligo(Squid), Teredo (Shipworm), Octopus(Devil fish) all belong to the phylum Mollusca,
- Physalia(Portugese man of war) and Aurelia(Jelly fish) belongs to phylum cnidaria but Bonnelia belongs to Annelida.
- Planaria and schistosoma belong to the phylum platyhelminthes but enterobiuse belong to Nematoda,
- Spongilla and Euplectella belong to phylum porifera but Pennatula belongs to cnidaria.

682. A Molluscan with calcareous spicules is
(a) Chaetoderma (b) Lepidopleurus
(c) Doris (d) Neopilina

AP EAMCET-2014

Ans. (a) : Calcareous spicules, characteristic of the calcarea are composed chiefly of calcium carbonate in crystalline which give them a beautiful shine. e.g. Neomenia Chaetoderma.

683. Mantle, foot and shell are the characteristics of
(a) Nautilus (b) Echinus
(c) Limulus (d) Euplectella

JIPMER-2005

Ans. (a) : The Nautilus is a pelagic marine molluscs of the cephalopod family Nautilidae. The Nautilus is the sole extant family of the super family Nautilaceae. Mantle, foot and shell are the characters of the mollusca.
- Echinus belongs to the phylum Echinodermata.
- Limulus belongs to the phylum arthropods.
- Euplectella belongs to the phylum porifera.

684. Match the following columns.

Columns-I	Columns-II
A. Sea lemon	1. Doris
B. Sea mussel	2. Mytilus
C. Garden snail	3. Helix
D. Grey slug	4. Limax

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	4	2	3	1
(d)	3	4	1	2

AIIMS-2015

Ans. (a) :
- Doris is commonly called as sea lemon or seal slug. Sea lemons are sluggish marine molluscs.
- Mytilus is a cosmopolitan genus of medium to large sized edible, mainly saltwater muscles which are widely as food and used in marine culture. Mytilus is commonly called as "sea mussels" mytilus belongs to phylum mollusca found near the tide shore and attached to the rock.
- **Helix**- The garden snail (Helix aspersa) is a terrestrial gastropod mollusk and one of the best knows species in the work. Hence garden snail refers to helix.
- **Limax**- Limax maximus, known by the common names great grey slug and leopard slug, is a species of slug in the family Lamacidae. Hence grey slug refers to Limax.

685. A wood boring mollusc/shipworm is
(a) Chiton (b) Teredo
(c) Limax (d) Patella

AIPMT-1988

Ans. (b) : Teredo is a class-pelecypoda bivalvia. It is commonly known as shipworm and it is destructive to wood in sea water. They are also called Teredo worms or termites of sea.

686. Whose secretion forms the pearls ?
(a) Prismatic layer
(b) Columnar epithelial cells of mantle
(c) Ciliated epithelial cells of mantle
(d) Connective tissue of mantle

CG PMT-2005

Ans. (b) : Pearls is formed due to secretion of the columnar epithelial cells of mantle tissue. The nacreous layer of the pearl is secreted by the outer epithelial layer of the mantle.
Columnar epithelial cells are those cells that have a tendency to change their shape and position and retain the same.

687. Which pair of the following Molluscs possess captacula?
(a) Unio and Mytilus
(b) Sepia and Octopus
(c) Dentalium and Pulsellum
(d) Neomenia and Neopilina

TS EAMCET-15.05.2016

Ans. (c) : Both Dentalium and Pulsellum have bilateral symmetry. In their body, tentacles are replaced by captacula. Captacula are number of minute tentacles present around the foot.
Captacula are thread like cilia-bearing tentacles probe for food, such as forams detrifus and even the occasional buried bivalve and bring it to the mouth where a large radula grinds it up.

688. Which of the following pairs is correct?
(a) annelida-polychaeta-leech
(b) arthropoda-crustacea-cockroach
(c) mollusca-cephalopoda-Octopus
(d) protozoa-Hydra

Punjab MET-2004
Rajasthan PMT-2003

Ans. (c) : Cephalopoda is a class of pylum Mollusca.
• Head and foot regions are combined and modified into a structure which has eyes and eight tentacles, hence the name cephalopod or 'head food'.
• Octopus belongs to this class

689. Which one is an example of living fossil?
(a) Coral (b) Ascidia
(c) Octopus (d) King crab

WB JEE-2014

Ans. (d) : King crab (Arthropoda) are example of living fossils.
An organism is regarded as living fossil if it remains essentially unchanged for a considerably long time in the course of evolution & whose close relatives are generally extinct. King crab continues to remain unchanged for past 190 million years. Hence, it is called living fossil.

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690. A pearl oyster secretes pearls to
(a) regenerate injured parts
(b) protect itself against invading parasite
(c) harden its mantle cavity
(d) isolate damaged tissues of the body
CG PMT-2004

Ans. (b) : Pearl is a hard sparkling object formed within the soft tissue of a living shelled of molluscs. The pearl is secreted by nacreous layer of pearl oyster as a protection against foreign body such as parasite or a sand particle.

691. Which one of the following matching pairs is incorrect?
(a) Mollusca - Pseudocoel
(b) Cnidaria - Nematocyst
(c) Annelida - Chloragogen
(d) Echinodermata - water vascular system
WB JEE-2015

Ans. (a) : Mollusca are coelomate animals. The body cavity is true coelom often reduced to haemocoel surrounding the heart, nephridia and gonads.

692. Which of the following animals is not only a living fossil but also considered as connecting link?
(a) Sphenodon (b) Limulns
(c) Neopilina (d) Latimeria
AP EAMCET-2007

Ans. (c) : Neopilina is a living fossil and also known as connecting link between two major groups of mollusks - the monoplacophora and the polyplacophora. It has cap-shaped shell and a muscular foot used for locomotion, while on other hand it also shows the characteristic with chitons having multiple shell plates or valves arranged in a row along their dorsal side.

693. Which one of the following phyla is correctly matched with its two general characteristic?
(a) Echinoderamata - Pentamerous radial symmetry and mostly internal fertilization
(b) Mollusca - Normally oviparous and development through a trochophore or veliger larva
(c) Arthropoda - Body divided into head, thorax and abdomen and respiration by tracheae
(d) Chordata - Notochord at some stage and separate anal and urinary openings to the outside
AIPMT-2008

Ans. (b) : Mollusks typically lay eggs and their embryos develop through stages known a as trochopore or veliger larva.

694. Osphradium in mollusca has function of
(a) respiration
(b) reproduction
(c) grinding of food
(d) testing physical and chemical qualities of food
UP CPMT-2005

Ans. (d): Osphradium in mollusca has function of testing physical and chemical qualities of food
Osphradium in mollusca has function of testing physical and chemical qualities of food. Testing physical and chemical qualities of food
• In mollusk, a single or paired sensory attachment to the visceral ganglia is called ospharadium. The major function of ospharadium is to test the incoming water for slit and food particles.

695. In which one of the following, the genus name, its two characters and its phylum are not correctly matched, whereas the remaining three are correct?

	Genus Name	Two Characters	Phylum
(a)	Sycon	(a) Pore bearing (b) Canal system	Porifera
(b)	Periplaneta	(a) Jointed appendages (b) Chitinuous exoskeleton	Arthropoda
(c)	Pila	(a) Body segmented (b) Mouth with Radula	Mollusca
(d)	Asterias	(a) Spiny skinned (b) Water vascular system	Echinoder-mata

AIPMT (Screening)-2012

Ans. (c) : Pila is a genus of freshwater snail belonging to the phylum Mollusca and they have unsegmented body. They have coiled shell and muscular foot for locomotion. The mouth contains a file- like resping organ for feeding, called radula.

J. Echinodermata

696. Aristotle's lantern is a characteristic of the following class of Echinodermata :
(a) Echinoidea (b) Ophiuroidea
(c) Holothuroidea (d) Asteroidea
HP CET-2011 / VMMC-2005
AMU-2004 / BVP-2003
AIPMT-1993/ BVP-2001
Manipal-2001 / Rajasthan PMT-1999
JIPMER-1998 / AIPMT-1993

Ans. (a) : Aristotle's lantern is a characterstics of Sea Urchin in class - Echinoidea of phylum Echinodermata.
Aristotle's lantern was first traced by Aristotle. It is involved in mastication. It is a complex arrangement of muscles and calcareous teeth and plates with forms a reversible organ in most echinoids.

697. Which of the following has radial symmetry in adult and bilateral symmetry in larva?
(a) Annelida (b) Coelenterata
(c) Echinoderms (d) Platyhelminthes
UP CPMT-2013 / Karnataka CET-2012
JCECE-2009 / CMC Ludhiana-2009
AFMC-2008 / DU MET-2004
AIPMT-2004 /BVP-2001

Ans. (c) : In phylum Echinodermata, the larval stage is bilaterally symmetrical whereas adults are radially symmetrical. Radial symmetry is the arrangement of

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parts of organism around a central axis so that the organism can be divided into similar halves by any plane. Bilateral symmetry can be divided only into mirror halves through a single plane. In echinoderms larvae haves bilateral symmetry but during metamorphosis this is replaced with radial symmetry.

698. Connecting link between Echinodermata and Chordata is

(a) Peripatus (b) Archaeopteryx
(c) Balanoglossus (d) None of these

CMC Ludhiana-2015 / AMU-2008
VMMC-2008 / AP EAMCET 2002

Ans. (c) : Connecting link between Echinodermata and chordata is balanoglossus. It is a marine organism. It can considered as an evolutionary link between vertebrates and invertebrates. It is hemicardata ocean-dwelling acorn worm.

- Archaeopteryx is connecting link between two classes of reptiles and birds.
- Peripatus is a living fossil.

699. In Echinodermata, tube feet are related with

(a) locomotion (b) excretory system
(c) respiratory system (d) reproductive system

HP CET-2011 / VMMC-2005
AMU-2004 / BVP-2003

Ans. (a) : Tube feet are locomotory organs of echinoderms consisting of elongated out growths of the body wall able to be protruded or retracted by alteration of fluid pressure in the water vascular system. In starfish, they are arranged in rows in ambulacral groove.

700. Tube feet is the locomotory organ of

(a) Star fish (b) Jelly fish
(c) Cray fish (d) Silver fish

BHU PMT (Screening)-2011 / CMC-Ludhiana-2011
JIPMER-2010 / AIPMT-1994

Ans. (a) : Tube feet, which are found as part of the water vascular system, are the locomotory organs in star fish. They are the exclusive feature of echinoderms like star fish. They are part of water vascular system which is a hydraulic system in echinoderms necessary for locomotion, ingestion, adhesion and gaseous exchange.

701. Aristotle's lantern is present in

(a) Echinoidea (b) Holothuroidea
(c) Asteroidea (d) Ophiuroidea

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Aristotle's lantern is a specialized feeding orgone structure that foung in some echinoderms and sea urchins.
It is a complex set of calcified structure surrounding the mouth of these organism use for scraping and grinding food.

702. Choose among the following the characters of ophiuroidea of phylum Echinodermata

(a) Madriporite is aboral, tube feet with suckers, Open Ambulacral grooves
(b) Closed Ambulacral grooves, tube feet without suckers. Absence of anus
(c) Arms absent, Anus is aboral, Closed Ambulacral grooves
(d) Open Ambulacral grooves, tube feet with suckers

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : Ophiuroidea is a class within the phylum Echinodermata. That have brittle stars and basket stars.

- Ophiuroids have a central dis that houses the vital organs and long slender arms that are usually distinct from the central disc ophiuriods have tube feet for locomotion but these not use for feeding as extensive as in other echinoderms.
- Ophiuriods has open ambulacral grooves. That run along the under sids of each arm and tube feet used for locomotion feeding and sensory perception.

703. Match the following :

	Larva		**Animals**
(A)	**Bipinnaria**	**(I)**	**Sea urchins**
(B)	**Auricularia**	**(II)**	**Brittle stars**
(C)	**Ophiopluteus**	**(III)**	**Star fishes**
(D)	**Doliolaria**	**(IV)**	**Sea lilies**
(E)	**Echinopluteus**	**(V)**	**Sea cucumbers**

The correct match is:

	A	**B**	**C**	**D**	**E**
(a)	III	IV	V	I	II
(b)	II	III	I	IV	V
(c)	III	V	II	IV	I
(d)	I	IV	II	V	III

TS EAMCET-10.08.2021 Shift-I

Ans. (c) :

Animals	-	**Larva**
Sea urchins	-	Echinopluteus (it is larval stage in echinoidea)
Brittle stars	-	Ophiopluteus
Star fishes	-	Bipinnaria
Sea lilies	-	Auricularia (1st larval stage)/Doliolaria (2nd larval stage)
Sea cucumber	-	Auricularia

704. Water vascular system is found in

(a) sea-anemone (b) sea-pen
(c) sea-cucumber (d) sea-horse

AP EAMCET-24.09.2020 Shift-I
WB JEE-2010

Ans. (c) : Sea-cucumber is the member of phylum echinodermata The most distinctive feature of echinoderms is the presence of water vascular system which helps in locomotion, capture and transport of food and respiration. An excretory system is absent.

- sea-anemone – Adamsia (Coelenterates or Cnidaria)
- sea-pen – Pennatula (Coelenterates or Cnidaria)
- sea-cucumber – Cucumaria (Echinoderms)
- sea-horse – Hippocampus (Pisces)

705. Match the right organism and its phylum

(a) Ancylostoma - Platyhelmenthis
(b) Nereis - Arthropoda
(c) Chaetopleura - Aschehelminthes
(d) Ophiura - Echinodermata

AP EAMCET-25.09.2020 Shift-II

Ans. (d) : Ophiura is a genus of echinoderms belonging to the family ophiuridae.

- Ophiura is also known as Brittle star.
- Ancylostoma (Hookworm) belongs to phylum Aschelminthes.
- Nereis belongs to phylum Annelida.
- Chaetopleura (chiton) belongs to phylum mollusca.

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706. Which of the following options have features corresponding to the given animals
Aplysia, Asterias, Antedon, Echinus
(a) Water vascular system, Calcareous shell
(b) Water Canal system, Calcareous shell
(c) Calcareous shell, acoelomate
(d) Pseudocoelomate, Water vascular system

AIIMS-26.05.2019 Shift-II

Ans. (a) : The animals aplysia, asterias, antedon and echinus all have a water vascular system for movement and feeding and they also possess a calcareous shell.
Hence, option (a) is correct answer.

707. Match the following :

	Set-I		Set-II
A.	Tornaria	I.	Neometra
B.	Brachiolaria	II.	Balanoglossus
C.	Pentacrinoid	III.	Holothuria
D.	Auricularia	IV.	Pentaceros

The correct match is

	A	B	C	D
(a)	II	I	III	IV
(b)	II	IV	I	III
(c)	I	III	II	IV
(d)	IV	III	I	II

TS EAMCET-08.05.2019 Shift-I

Ans. (b) : Tornaria - Balanoglossus
Brachiolaria - Pentaceros
Pentacrinoid - Neometra
Auricularia - Holothuria.

708. Which of the following is a mismatch pair?
(a) Scales - Reptilia
(b) Comb plates - Mollusca
(c) Choanocytes - Porifera
(d) Parapodia - Annelida

Tripura JEE-2017
AMU-2015

Ans. (b) : Comb plates :- Comb plates are large ciliary structure uniquely seen in comb jellies (ctenophores). A comb plate is constructed from tens of thousands of cillia that are bundled together by structures called compart menting camellae.
• Pleurobrachia is the organism in which comb plates are found. It is not found in mollusca.

709. Secondary radial symmetry is found in
(a) Cnidaria (b) Jelly fish
(c) Echinodermata (d) Hemichordata

VMMC-2011
Uttarakhand PMT-2009

Ans. (c) : Secondary radial symmetry occurs in Echinodermata. Larva of echinoderms are bilaterally symmetrical but in the adult they shows radially symmetry.
• In both larval and adult stages Jelly-fish and Cnidarians shows radial symmetry.
• Hemichordates shows bilateral symmetry.

710. Radial symmetry is found in:
(a) frog (b) starfish
(c) humans (d) Pheretima

Rajasthan PMT-2004

Ans. (b) : When any plane passing through the central axis divides the body of an organism into two equal halves then the symmetry is radial symmetry.
eg:- Star fish, Coral polyp and sand dollars.

711. 'Basket star' belongs to class.
(a) Echinoidea (b) Asteroidea
(c) Crinoidea (d) Ophiuroidea

AFMC-2000 / AIIMS-1999

Ans. (d) : Basket star belongs to phylum Echinodermata and class- ophiuroidea. Basket star related to brittle stars and sea stars. They have radial symmetry which means their body parts radiate from a central point.

712. Starfish belongs to phylum
(a) Porifera (b) Coelentrata
(c) Echinodermata (d) Arthropoda

UP CPMT-2003

Ans. (c) : Starfish belongs to phylum echinodermata. They are triploblastic, coelomate, Body shape is rounded to cylindrical or star-like.
• Porifera includes the sponges.
• Coelenterata includes the multicellular organism with hollow intestines. Ex-hydra.
• Arthropoda includes the insects with jointed appendages.

713. What are the locomatory organs in Echinoderms?
(a) Mantle (b) Tube feet
(c) Ommatidia (d) Pedicullariae

UP CPMT-2012 / Haryana PMT-2004
Manipal-2003

Ans. (b) : Tube feet are a characteristic of the phylum Echinodermata.
• They are a characteristic organ of the star fishes.
• They are a part of the water vascular system, which is a hydraulic system in echinoderms necessary for locomotion, food ingestion, adhesion and gas exchange.
• They are marine animals with spiny skin.
• They have an exoskeleton of the calcareous plates from which the spine arises.

714. Read the statements regarding echinoderms and choose the correct option
(i) All are marine with organ system level of organisation
(ii) Adults are bilaterally symmetrical
(iii) They are dioecious
(iv) Fertilisation is internal and indirect development is observed
(v) Triploblastic and acoelomate animals
(a) i and iii are correct (b) v alone is correct
(c) i, iii and v are correct (d) i and v are correct
(e) i and ii are correct

Kerala PMT-2015

Ans. (a) : • The organisms belongs to the phylum Echinodermata are exclusively marine.
• They are multicellular organisms with well developed organ systems.
• Most members have a circulatory system as well as a digestive system.
• They all show pentamerous. Radial symmetry in the adult stage.

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715. Which of the following is an exclusively echinoderm character?
(a) Radial symmetry
(b) Tube feet
(c) Mesodermal endoskeleton
(d) Coelom divided

AMU-2010

Ans. (b) : Tube feet is an exclusively echinoderms character which help in locomotion. Tube feet are small, delicate projections attached along the side of a water-filled tube called a radial canal.

716. The response to external stimulus is quicker and more precise in this symmetry:
(a) radial (b) bilateral
(c) spherical (d) biradial

AP EAMCET-2003

Ans. (b) : The response to external stimulus is quicker and more precise in bilateral symmetry.
In bilateral symmetry animals, the anterior end or differentiated into head with the concentration of nervous tissue and nightly efficient sense organs so the bodily function becomes more coordinated.

717. Aristotles lantern is connected with
(a) respiration (b) mastication
(c) excretion (d) support

AMU-2008 / VMMC-2008

Ans. (b) : Aristotles lantern is connected with mastication. Sea urchins possess an intricate mouth apparatus that's located on the underside of their bodies.
- It's referred to as an Aristotle's Lantern.
- The lantern, where present, surrounds both the mouth cavity and the pharynx. It is involved in mastication.

718. Ambulacral system is mainly useful for
(a) locomotion (b) circulation
(c) feeding (d) defence

AMU-2005
Manipal-2004

Ans. (a) : An Ambulacral system is also known as vascular system or hydraulic system. It is a complete system which comprises of pipe like structure known as canals. An ambulacral groove is also found- It extends from the mouth to the technical part of the arm,- It performs various functions such as movement, transportation of food and various other products and exchange of gases (aspiration). It performs locomotion through muscle contraction.

719. Water vascular system is found in
(a) Mollusca (b) Arthropoda
(c) Annelida (d) Echinodermata

CMC Vellore-2010 / AMU-2009
MGIMS Wardha-2009

Ans. (d) : The water vascular system is a hydraulic system typically used by echinoderms like sea stars and sea urchins, for locomotion, food and waste transportation, and respiration.

720. Which of the following is an enterocoelic invertebrate ?
(a) Sepia (b) Cimex
(c) Ophiothrix (d) Polygordius

DUMET-2001
AP EAMCET-1997

Ans. (c) : Ophiothrix is large genus of brittle stars (Ophiuroidea) that is found in oceans worldwide from tropics to Arctic and Antarctic regions which has an enterocoelic coelom (enterocoel). Enterocoelic coelom develops as mesodermal pouches arising from the gut of the embryo.

721. Starfish belongs to the class
(a) Pisces (b) Cephalopoda
(c) Asteroidea (d) Ophuroidea

Rajasthan PMT-2011
AIPMT-1992

Ans. (c) : Starfish belongs to the Asteroidea family.
- It has water channel system and these are radially symmetrical.
- These have tube feet for locomotion.
- These are triploblastic in nature and are coelomale.
- This class has a pentaradial body plan.
- Brittle stars (Ophiurida) and basket stars (Euryalida)
- These are marine organisms with five-fold radial symmetry.

722. The water vascular system performs all but not one function which is that:
(a) excretion (b) respiration
(c) food capturing (d) hormone secretion

VMMC-2003 / Haryana pmt-2001

Ans. (d) : The water vascular system does not have function related to hormone secretion. It primarily performs tasks like food capturing, respiration and movement in certain marine animals.

723. Scientific name of starfish is
(a) Echinus (b) Limulus
(c) Echidna (d) Asterias

AMU-2003

Ans. (d) : Scientific name of starfish is Asterias. It is a phylum of Echodermata.
They are triploblastic and coelomate animals. Digestive system is complete with mouth on the lower (ventral) side and anus on the upper (dorsal) side. The most distinctive feature of echinoderms is the presence of water vascular system which helps in locomotion, capture and transport of food and respiration.

724. The nature of exoskeleton in echinoderms is
(a) calcareous (b) chitinous
(c) siliceous (d) tunicin

J&K CET-2002

Ans. (a) : The calcareous exoskeleton is found in the phylum echinodermata. The Echinodermata have spiny texture skin. They have an exoskeleton made up of spicules. The spicules are spiny structures that are made up of calcium carbonate minerals.

725. Which of the phylum has none of fresh water from?
(a) Echinodermata (b) Mollusca
(c) Chordata (d) Porifera

BVP-2004 / DU MET-2003
Rajasthan PMT-1999

Ans. (a) : Echinodermate animals have an endoskeleton of calcareous ossicles and, hence, the name Echinodermata (spiny bodied). All are marine with organ-system level of organisation. It means phylum Echinodermate has none of fresh water form.

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726. The presence of tube feet is a characteristic feature of the phylum
(a) Arthropod (b) Annelida
(c) Nemathelminthes (d) Echinodermata
(e) Mollusca
Kerala PMT-2009 / BVP-2005 / Manipal-2002

Ans. (d) : Tube feet is a characteristic feature of the phylum echinodermata. Tube feet are the small tubular projection present in the oral surface of a sea vascular system of the phylum echinoderm. The most important function of the tube is to help locomotion, respiration and feeding.

727. The echinodermata are exclusively.
(a) arboreal insects (b) marine animals
(c) terrestrial insects (d) freshwater forms
Punjab MET-2011 / JIPMER-2010

Ans. (b) : All echinodermata are marine animals.
They are triploblastic and coelomate animals. Digestive system is complete with mouth on the lower (ventral) side and anus on the upper (dorsal) side. The most distinctive feature of echinoderms is the presence of water vascular system which helps in locomotion, capture and transport of food and respiration.

728. Antedon belongs to which of the following class?
(a) Asteroidea (b) Ophiuroidea
(c) Crinoidea (d) Echinoidea
AIIMS-2000

Ans. (c) : Antedon belongs to the class crinoidea. It is a type of marine animal commonly known as a feather star or crinoid. Crinoids are echinoderms characterized by their feathery arms and are part of the class crinoidea.

729. Ambulacral grooves are absent in the living forms of the class
(a) Crinoidea (b) Asteroidea
(c) Ophiuroidea (d) Echinodermata.
AIIMS-2002

Ans. (c) : Ambulacral groove is a furrow bordered by large spines extending along the oral surface of each arm. Each groove of each arm contains two to four rows of hollow tube feet that can be extended or withdrawn.
• The ambulacral grooves are present in asteroidea.

730. Which one of the following does not have an excretory system ?
(a) Myxine (b) Carcharodon
(c) Balanoglossus (d) Asterias
(e) Catla
Kerala PMT-2011

Ans. (d) : Asterias, which is a type of starfish, does not have a traditional excretory system like other animals. Instead of excreting waste through specialized organs, starfish rely on simple diffusion and the movement of fluids within their body cavities to eliminate waste products. This is one of the unique characteristics of starfish anatomy.

731. Autotamy, a phenomenon is well marked in
(a) annelids (b) arthropods
(c) mollusca (d) echinodermata
Punjab MET-2011

Ans. (d) : Autotamy, a phenomenon is well marked in echinodermata. The ability of certain animals to release part of the body that has been grasped by an external agent.
• Organisms of the phylum echinodermata have ability of Autotamy.

732. Water vascular system is a pecularity of :
(a) Porifera (b) Coelenterata
(c) Mollusca (d) Echinodermata
WB JEE-2008/ Punjab MET-2008
Rajasthan PMT-2001

Ans. (d) : Vascular system is a characteristic feature of the phylum echinodermata. The water vascular system helps in food capture. This system is controlled hydraulically.

733. Broken arms are regenerated in
(a) fishes (b) molluscs
(c) echinoderms (d) human beings
BVP-2011

Ans. (c) : Regeneration of broken arms is called restorative regeneration. It occurs in Echinodermata. Echinoderms can regenerate their appendages or limb, internal organs and some parts of nervous system.

734. Which of the following is properly matched?
(a) Platyhelminthes – Trematoda – Planaria
(b) Echinodermata – Asteroidea – Star fish
(c) Arthropoda – Insecta – Spider
(d) Mollusca – Cephalopoda – Unio
BVP-2015 / Manipal-2009 / Karnataka CET-2009

Ans. (b) : Star fish is also called sea star is a marine invertebrate of the class-Asteroidea of phylum-Echinodermata.
• **Trematoda :** Trematodes are flatworm classified in the phylum platyhelminthes, Trematoda subclass - Digenea.
• **Cephalopoda:** Phylum mollusca have class cephalopoda a small group of highly advanced and organized exclusively marine animals.
• The subclass Arachnida represents the diverse group of arthropods that includes spiders, scorpions, mites, ticks etc. Hence, only the (b) is properly matched.

735. Find the odd example.
(a) Sea cucumber (b) Sea urchin
(c) Sea lily (d) Sea fan
Karnataka CET-2007

Ans. (d) : Sea lily is antedon, sea cucumber is cucumaria and sea urchin is echinus. These three belong to phylum Echinodermata. These animal have spiny body (Echino means spine derwa is skin).
Sea fan (Gorgonia) belongs to phylum coelenterate. Therefore, sea fan is an odd example.

736. The bilateria member that exhibits pentaradial symmetry is
(a) Neomenia (b) Nautilus
(c) Neometra (d) Neopilina
AP EAMCET-2008

Ans. (c) : Adult echinoderms have pentamerous radial symmetry, while the larva has bilateral symmetry in Neometra. Neometra acanthaster is a species of echinoderms in the family calometridae.

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737. In Ophiuroidea, branched arms are seen in

(a) Gorgonocephalus (b) Clypeaster
(c) Salmacis (d) Gorgonia

AP EAMCET-2009

Ans. (a) : Gorgonocephalus is a genus of marine water, brittle stars belonging to the family Ophiuroidea has a basket or fan like branched arms are seen.
Ophiuroidea have five arms joined to central body disc (branched arms) Gorgonocephalus sp., is similar to the Asteroidea.

K. Hemichordata

738. Assertion (A) : Hemichordat is now placed as separate phylum under non-chordata.
Reason (R) : The stomochord of these animals was once believed to be the notochord.

(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not correct explanation of A
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : The stomochord and Notochord are two distinct structure fund in chordates.
Stomochord: is present the primitive chordates like hemichordate and located in mouth and intestine and function is supporting the pharyngeal region and aiding in filter feeding.
The Notochord is present in chordate and all vertebrates.
It is flexible, rod like structure that runs thru dorsal side of the body.
Notochord support and provides the basis of muscles attachment.
The Notochord it more complex and fundamental structure in chordates white the stomochord is specific to certain group of phylum like hemichor dates.

739. Radial symmetry is NOT found in adults of phylum _____.

(a) Echinodermata (b) Ctenophora
(c) Hemichordata (d) Coelenterata

NEET (UG) 07.05.2023

Ans. (c) : The hemichordates are represented by organisms such as the acorn worms and they are solitary worms like organisms with a proboscis and collar. They exhibit bilateral symmetry.
• The condition of having similar parts regularly arranged around a central axis.

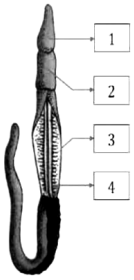
740. Larva of balanoglossus is _____

(a) Tadpole (b) Tornaria
(c) Muller's larva (d) Valrus larva

AP EAMCET-12.07.2022 Shift-II
AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Balanoglossus belongs to the phylum-hemichordata.
The animals in hemichordata have a short notochord present in the anterior part of the body. There are two class in the hemichordata known as 'Enteropheusta' and 'Ptetrobranchia'. The larva of the animals of the formal class is called as tornaria. Tornaria larva is the planktonic larva. It is just like bipinnaria larva of star fishes.

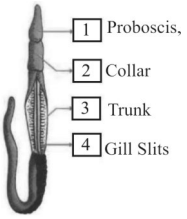
741. Label the parts corresponding to the numbers in the diagram given below?



(a) 1. Collar, 2. Gill Slits, 3. Proboscis, 4. Trunk
(b) 1. Proboscis, 2. Collar, 3. Trunk, 4. Gill Slits
(c) 1. Proboscis, 2. Trunk, 3. Gill Slits, 4. Collar
(d) 1. Proboscis, 2. Gill Slits, 3. Collar, 4. Trunk

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : Given diagram is belongs to balanoglossus of phylum hemichordata. Their body is a cylindrical like worms and divided into 3 main parts : an anterior part is proboscis, a collor & a trunk. The function of gill slits in hemichordate is for the movement of water in the mouth.



742. Match the following

List-I		List-II	
A.	**Trichimella**	**I.**	**Xiphisura**
B.	**Trocophore**	**II.**	**Turbellaria**
C.	**Tornaria**	**III.**	**Porifera**
D.	**Trilobite**	**IV.**	**Polychaeta**
		V.	**Hemichordata**

The correct answer is
Options :

	A	B	C	D
(a)	III	IV	V	I
(b)	III	V	IV	I
(c)	V	III	IV	I
(d)	V	IV	III	II

AP EAMCET-24.04.2019 Shift-I

Ans. (a) : :

	List-I	List-II
A.	Trichimella	Porifera
B.	Trocophore	Polychaeta
C.	Tornaria	Hemichordata
D.	Trilobite	Xiphisura

743. In sea anemone, the symmetry is

(a) Radial (b) Bilateral
(c) Spherical (d) Absent

MGIMS Wardha-2008

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Ans. (a) : Sea anemone processes a radial symmetry due to its sessile nature. Radial symmetry attributes to the kind of symmetry that separates the body into two halves along a central axis. Radial symmetry is the arrangement of body parts around a central axis or pieces in a pie. Radially symmetrical animals possess top and bottom surfaces, but no left and right sides, or front and back. This type of symmetry is seen in the phylum Ctenophora and Cnidaria.

744. Blood vascular system in hemichordate is :
(a) open (b) reduced
(c) closed (d) absent

AFMC-2006

Ans. (a) : : The circulatory system in hemichordates is simple with an open type. The blood vascular system includes a dorsal heart with two longitudinal vessels. The blood flows openly in the haemocoel.

745. Modern representative of an ancient link between the echinoderms and the chordates is represented by.
(a) Hemichordata (b) Urochordata
(c) Cephalochordata (d) Vertebrates

JCECE-2015

Ans. (a) : Hemichordates are the primitive connecting link between chordates and non-chordates. Hemichordata and echinoderms are generally considered as sister groups as they share similar relations up with each other. Notochord and pharyngeal characteristics are found in hemichordates. These characteristics are common in chordates.
Dorsal heart is found in non-chordates and hemichordates are dorsal heart animal. That's why hemichordate have some character of chordate as well as non-chordate.

746. Excretory organ of Balanoglossus is
(a) Malpighian tubules (b) flame cells
(c) nephridia (d) proboscis gland

Haryana PMT-2011
Kerala PMT-2011

Ans. (d) : Balanoglossus belongs to the phylum hemichordata. Excretory organ of balonoglassus is proboscis gland or glomerulus. This gland situated in front of the central sinus. The gland protrudes throughout the proboscis coelom.
These organs are considered glomerulus because they resemble the glomeruli of kidney of vertebrates. Glomeruli are located on either side of the bladder and form the bladder and central sinus.

747. Match the branches of biology given under Column I with the field of study listed under Column II; choose the answer which gives the correct combination of alphabets of two columns

	Column-I (Branch of Biology)	Column-II (Field of study)	
A	Malacology	p	Reptiles
B	Pomology	q	Fungi
C	Mycology	r	Fruits
D	Ornithology	s	Molluscs
		t	Birds

(a) A = p; B = r; C = q; D = t
(b) A = t; B = s; C = q; D = p
(c) A = s; B = r; C = q; D = t
(d) A = s; B = r; C = p; D = t

Karnataka CET-2004

Ans. (c) : Malacology : Study of molluscs
Pomology : Fruits
Mycology : Fungi
Ornithology : Birds

748. Connecting link between chordates and non-chordates is
(a) Peripatus (b) Balanoglossus
(c) Sphenodon (d) Tachyglossus

UP CPMT-2011

Ans. (b): • Balanoglossus is a connecting link between chordates and non-chordates because it's shows few resemblance with chordates-having notochord, pharyngeal gill slits and on other hand it is also display key features of non-chordates like presence of dorsal heart etc. The tornaria larva of balonoglossus shows a very striking resemblance with the bipinnaria larva of echinodermata.
• Peripatus is an invertebrate and connecting link between the annelida and arthropoda.

L. Chordata

749. The group of anamniota includes
(a) Reptiles and birds
(b) Birds and mammals
(c) Fishes an amphibians
(d) Reptiles and mammals

VMMC-2012 / JIPMER-2009
CG PMT-2008 / BVP-2007
MGIMS Wardha-2006 / AP EAMCET-1998

Ans. (c) : The anamniotes is a group comprising the fishes and the amphibians.
• They are also called lower vertebrates, which lay their eggs in water.
• A vertebrate that lacks an amnion and whose embryos and larvae must therefore develop in water.
• Anamniotes comprise the agnathans, fishes and amphibians.

750. Assertion (A) : The heart of fishes is called branchial heart
Reason (R) : Only deoxygenated blood flows through it.
(a) A and R are true, R is correct explanation for A
(b) A and R true, but R is not correct explanation for A
(c) A is true But R is false
(d) A is false But R is true

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : Heat of fish is two chamberd called singal circuit heart or venus heart.
Heart of fish have one auricle and one vertrical this heart receive deoxygenated blood from whole body except gills.
• Both renal and hepatic portal system is present and RBC are nucleated.

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751. Example of anadromous migration is

(a) Salmon and Hilsa (b) Anguilla
(c) Catla Catla (d) Labeo

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Migration is very common in fish due to the either breeding purpose for food and for suitable environment fish migration is 3 type

i. Potomodromous

ii. Oceanodromous

iii. Diadromous.

Anadromous fish migration is type of Diadromous fish migration Anadromous fishes are migrate from sea water to fresh water for breeding purpose such as Hilsa, Salmon, Striped bass, Petromy zone.

752. The closest invertebrate relatives of chordates belong to the phylum

(a) Mollusca (b) Echinodermata
(c) Coelenterata (d) Arthropoda

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : The closest invertebrate relatives of chordates belong to the phylum echinodermata because both are possess life part of deuterostome group of animal.

It the blastopare formed posterior opening (anus) called deuteromates animals.

- Despite their anatomical differences, genetic and developmental studies have shown that echinoderme are more closely related to chordates that other invertebrate groups.

753. Assertion (A): It is necessary to know the life history of an ascidian to consider it a chordate.
Reason (R): Ascidians exhibit retrogressive metamorphosis in which larval stages are in a degenerated condition.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : An ascidian, also know as sea squirt is a marine invertebrate belonging to the phylum chordate. Despite its adult form appearing quits different from other chordates.

The ascidian have notochord, which is a flexible rod-like structure providing support and dorsal nerve cord that eventually divelops into the spinal cord. These indicat the evolutionary connection to vertebrates and other chordates.

Assidian or sea squirt exhibit retrogressive metamosiphosis. This means that during their development series of changes that result in the loss of certain structure, not larval stages.

754. Identify the incorrect pair regarding Vertebrae

(A) Birids - Amphicoelus
(B) Fishes - Procoelus
(C) Urodela - Procoelus
(D) Caecillians - Amphicoelus

(a) A, C (b) A, D
(c) B, D (d) B, C

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : Amphicoelus is veritebral centrum that have both the anterior (front) and posterior (back) end of the vertebral centrum are concave or hollowed out. this creates a biconcave shape, resempling a fingre light or an hourglass.

In birds, amphicoelus present near neck region.

Procoelous vertebrae that having a concave or hollowed out anterior (front) end of the vertebral centrum and convex or rounded posterior (back) end.

Procoelous vertebralcentyum is commonly found in the trunk and fail regions of many urodeles.

755. One of the following is commonly called flying fox

(a) Macropus (b) Draco
(c) Exocoetus (d) Pteropus

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : Flying fox also called certain type of bats the pleropus is genus of fruits bats commonly known as flying foxes due to their fox-like faces and their ability to fly.

Bat also help in pollination called. 'chiropterophilly'

756. The connecting link between reptiles and mammals is

(a) Eusthenopteron (b) Seymouria
(c) Archaeopteryx (d) Cynognathus

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : The connecting link between reptiles and mammals is archaeopteryx.

It is a ancient bird-like dinosaur that lived during the Jurassic period.

Archaeopteryx exhibits characteristics of both reptiles and birds, which provides evidence for the evolutionary transition from reptilian ancestors to modern birds.

While Archaeopteryx does not directly connect reptiles to mammals.

757. The notochordal mesoderm induces the overlying ectodermal cells that are involved in the formation of

(a) Neural groove (b) Neural plate
(c) Neural tube (d) Neural gland

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : The noto chordal mesoderm induces the overlying ectodermal cell that are involve in the formation of Neural plate. The Neural pate thickening of the ectodermal layer, further many neural folds with neural groove formation of neural tube.

758. Prochordate that exhibits bioluminescence

(a) Chaetopterus (b) Pyrosoma
(c) Firefly (d) Jelly Fish

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : Parosoma is prochordata that exhibits bioluminescence.

Bioluminescence the light emission by an organism. Parosoma pinnatum, are known for their bioluminescence often as a defense mechanism or for communication purposes.

759. Blocks of muscles found in cephalochordata are

(a) Matigonemes (b) Myotomes
(c) Myonemes (d) Sarcomere

AP EAPCET-23.05.2023, Shift-I

@apna_pdf

Ans. (b) : In cephalochordate, such as the lancelets or amphioxus, myotomes are segmented muscle blocks along the body.
These mytomes are segmented muscle blocks along the b body.
These mytomes are arranged in series and allow for rhythmic contraction that aid in locomotion helping the animal to swim in a wave like motion .

760. Choose the incorrect statements regarding Hemichordata
A. Stomochord extends into proboscis
B. They have ventral heart with closed type of circulatory system
C. Development includes Tornaria larva
D. Cloacal respiration takes place by respiratory trees.
(a) B, D (b) A, C
(c) B, C (d) A, D

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : Hemichordata are half chordates thy are primitive chordates and they may be responsible for organ of chorodata.
Circulatory system simple and open type having a heart on dorsal side
Excretion is through the proboscis gland or glomerulus connected to blood vessels.

761. Assertion (A) : Life cycle of ectoparasites is more complex with many developmental stages.
Reason (R) : Developmental stages of endoparasites have better chances to reach definitive host.
(a) Both A and R correct explanation of A
(b) Both A and R are correct but R is not correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct.

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : The life cycle of ectoparasites which live on the external surface of their host simple life cycle, involving stage like egg, nymph and adult, other can have with additional developmental. stages and interaction.
Endoparasite - have various developmental stage in their file cycle, depending on the specific parasite species, and its host as compairs to uctoparasites.

762. Identify the structure found in the early embryonic stages of amniotes that provides a clue to their aquatic ancestry.
(a) Endostyle
(b) Nuclei Pulposi
(c) Nonfunctional Pharyngeal pouches
(d) Air Bladder

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Pharyngeal pouches are developmental feature found in the embryos of all vertebrates, in duding amniotes (reptiles, birds, and mammals) These pouches are involved in development of various structures like the gills in aquatic organisms or parts of the ear and throat in terrestrial organism pharyngeal pouches play a role in the embryonic development of various structure, but non function pharyngeal pouches responsible for providing aquatic ancestors, to amniotes.

763. Select the correct statements with reference to chordates.
A. Presence of a mid-dorsal, solid and double nerve cord.
B. Presence of closed circulatory system.
C. Presence of paired pharyngeal gillslits.
D. Presence of dorsal heart
E. Triploblastic pseudocoelomate animals.
Choose the correct answer from the options given below :
(a) C, D and E only (b) A, C and D only
(c) B and C only (d) B, D and E only

NEET (UG) 07.05.2023

Ans. (c) : Vertebrate and a few invertebrates, have a closed circulatory system.
• Phylum chordate is characterized by the presence of a notochord, a dorsal hollow nerve cord and paired pharyngeal gill slits.

764. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : All vertebrates are chordates but all chordates are not vertebrates.
Reason (R) : Notochord is replaced by vertebral column in the adult vertebrates.
In the light of the above statements, choose the most appropriate answer from the option given below:
(a) (A) is not correct but (R) is correct
(b) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(c) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(d) (A) is correct but (R) is not correct

NEET-2022

Ans. (b) : All chordates are divided into three subphyla-Urochordates, cephalochordate and vertebrate. In subphylum vertebrata, notochord is replaced by bony or cartilaginous vertebral column but in urochordata and cephalochordate notochord is not replaced by vertebral column therefore all vertebrates are chordates but all chordates are not vertebrates.

765. Match the following:

Zoological name	Common name
(A) Hemidactylus	**(I) Flying lizard**
(B) Bungarus	**(II) Flying fox**
(C) Draco	**(III) Wall lizard**
(D) Pteropus	**(V) Krait**

	A	B	C	D
(a)	III	V	I	IV
(b)	II	I	V	III
(c)	III	V	I	II
(d)	IV	III	II	I

TS EAMCET-30.07.2022 Shift-II

Ans. (c) :

Zoological name	Common name
A. Hemidactylus	Wall lizard
B. Bungarus	Krait
C. Draco	Flying lizard
D. Ptecopus	Flying fox

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766. Study the following table and pick up the incorrect combination (s).

S. No	Group	Salient feature	Example
S.No			
(I)	Cyclostomata	Absence of renal portal system	Lamprey
(II)	Gnathostomata	Internal ears with three semi circular canals each	Lancelet
(III)	Chondrichthyes	Heterocercal caudal fin	Torpedo
(IV)	Osteichthyes	Absence of air bladder	Catla

Options:

(a) I, II (b) II, IV
(c) II, III (d) I, IV

TS EAMCET-30.07.2022 Shift-II

Ans. (b) : Gnathostomata- The semicircular canals are three semicircular inter connected tubes located in the innermost part of each ear the inner ear. The three canals are - the horizontal, superior and posterior semicircular canals.

• Gnathostomata consists of species of fishes which have jaws.

767. Assertion (A): Branchiostoma is often described as typical chordate.
Reason (R): It has a myogenic heart.
The correct option among the following is

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true and (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-30.07.2022 Shift-II

Ans. (c) : Branchiostoma is often described as typical chordate. The Branchiostoma heart is a rosteocaudally extended tube consisting entirely of myocardial cells, there are no chambers, valves endocaldium epicaldium of other differentiated features of vertebrate hearts.

768. Which of the following statements is true?

(a) All chordates are vertebrates but all vertebrates are not chordates
(b) All vertebrates are chordates but all chordates are not vertebrates
(c) All chordates bear jaws
(d) All vertebrates bear jaws

AP EAMCET-11.07.2022 Shift-II

Ans. (b) : All vertebrates are chordates but all chordates are not vertebrates. Vertebrates also have a ventral muscular heart, kidney for excretions and osmoregulation etc.

769. The nerve cord chordates is _____

(a) Single, solid, tubular and non–ganglionated
(b) Double, hollow, tubular and non–ganglionated
(c) Single, hollow, tubular and ganglionated
(d) Single, hollow, tubular and non-ganglionated

AP EAMCET-06.09.2021 Shift-I

Ans. (d): The dorsal nerve cord is a unique feature to chordates, & it is mainly found in the vertebrata, Which is subphylum of Chordate. The nerve cord of chordates lying above the notochord is a single hollow, tubular & non- ganglionated.

770. Which of the following statements are true for the phylum-Chordata?

(A) In Urochordata notochord extends from head to tail and it is present throughout their life.
(B) In Vertebrata notochord is present during the embryonic period only.
(C) Central nervous system is dorsal and hollow.
(D) Chordata is divided into 3 subphyla: Hemichordata, Tunicata and Cephalochordata.

(a) (C) and (A) (b) (A) and (B)
(c) (B) and (C) (d) (D) and (C)

NEET-2020 Phase-I

Ans. (c) : Phylum Chordata belongs to the Kingdom Animalia and includes all the vertebrates.
Characteristics of phylum Chordata :

(1) Notochord : It support the nerve chord of replaced by vertebral column after the embryonic state in all vertebrates.
(2) Dorsal hollow nerve chord : It is a bundle of nerves running along the back.
(3) Pharyngeal slits : They are the openings which allow the entry of water through the mouth without enterning the digestive system. They connect mouth and throat.

771. Match the following

	Group		Types of vertebrae
A.	Pisces	I.	Amphiplatyon
B.	Reptilia	II.	Procoelous
C.	Aves	III.	Opisthocoelous
D.	Mammalia	IV.	Amphicoelous
		V.	Heterocoelous

The correct match is:

	A	B	C	D
(a)	IV	II	V	I
(b)	I	V	II	IV
(c)	III	II	IV	I
(d)	IV	V	III	I

TS EAMCET-28.09.2020 Shift-II

Ans. (a) :

	Group	Type of vertebrae
A.	Pisces	Amphicoelous
B.	Reptilia	Procoelous
C.	Aves	Hetreocoelous
D.	Mammalia	Amphiplatyon

772. Vitelline membrane is a_____

(a) Secondary egg membrane
(b) Primary egg membrane
(c) Tertiary egg membrane
(d) None of these options are correct

AP EAMCET-24.09.2020 Shift-I

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Ans. (b) : Vitelline membrane is a primary egg membrane. This primary membrane is called as vitelline membrane in insects birds, molluscs and amphilbians. The vitelline membrane or vitelline enevelope is a structure surrounding the outer surface of the plasma membrane of an ovum or in some animals.

773. The distinguishing feature of all chordates is :
(a) a water vascular system
(b) an elastic rod (notochord)
(c) achitinous exoskeleton
(d) a ventrally placed nerve cord

AP EAMCET-24.09.2020 Shift-II
JIPMER-2000

Ans. (b) : The chordates are named for the presence of notochord a flexible, rod shaped structure that is formed in the embryonic stage of all chordates and also in the adult stage of some chordate species. It is located between the digestive tube and the nerve cord, providing skeletal support through the length of the body.

774. Statement (S): Chordates have a tail extending posterior to the anus. It contains skeletal elements and muscles but lacks coelom and visceral organs.
Reason (R) : In aquatic organism it acts as a balancing organ.
The correct answer is
(a) Both (S) and (R) are correct and (R) is the correct explanation to (S).
(b) Both (S) and (R) are correct.
(c) (S) is correct but (R) is incorrect.
(d) (S) is not correct but (R) is correct.

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Chordata have a tail extending posterior to the anus. It contains skeletons element and muscle but lacks coelom and visceral organs. The statocyst is a balance sensory receptor present in some aquatic invertebrate. So statement is correct but reason is incorrect.

775. Match the following

List-I	List-II
(A) Cuttle Fish	**(i) Green glands**
(B) Devil fish	**(ii) Medusoid form**
(C) Cray Fish	**(iii) External shell**
(D) Jelly fish	**(iv) Internal shell**
	(v) Shell is absent

The correct answer is
Options:

	A	B	C	D
(a)	III	V	II	I
(b)	IV	V	II	I
(c)	IV	V	I	II
(d)	III	II	I	V

AP EAMCET-24.04.2019 Shift-II

Ans. (c) :

Cuttle-fish	-	internal shell
Devil-fish	-	Shell is absent
Cray-fish	-	Green gland
Jelly-fish	-	Medussoid form

776. Which of the following represents order of 'Horse'?
(a) Equidae (b) Perissodactyla
(c) Caballus (d) Ferus

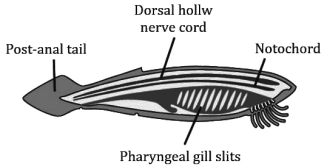
NEET-2017

Ans. (b) : Horse belongs to the 'order perissodactyla' which represents odd toaded mammals.
• Equidae is the family of the horse, equas is the genus, ferus is the species and caballus is a sub species.

777. An important characteristic that Hemichordates share with Chordates is
(a) Absence of notochord
(b) Ventral tubular nerve cord
(c) Pharynx with gill slits
(d) Pharynx without gill slits

NEET-2017 / JIPMER-2000

Ans. (c): The important characteristic that hemichordates share with chordates is pharynx with gill slits.
• These gill slits are narrow opening in the pharynx. The position of these pharyngeal gill slits a lateral in chordates, while dorsal in hemichordates.



778. The type of vertebrae in sub-order ophidian is
(a) amphicoelous (b) acoelous
(c) haterocoelous (d) procoelous

Punjab MET-1999
AFMC-2002

Ans. (d) : The type of vertebrae in sub-order ophidian is acoelous. Ophidia is a suborder, of reptiles that includes the snakes. They have procelous vertebrae. In procelous vertebrae the anterion surface is concave and pestrion surgace is convex.

779. Pick the odd one out.
(a) Chelone, Calotes, Naja
(b) Pavo, Psittacula, Ornithorhynchus
(c) Canis, Felis, Rattus
(d) Bufo, Rana, Hyla

AMU-2015

Ans. (b) : Chelone, calotes, Naja are generally are reptiles.
- Canis, felis and Rattus are generally well evolved creatures. They belongs to the class mammal.
- Bufo, Rana and Hyla are on the whole creatures of land and water. They belongs to the class amphibia.
- Pavo and Psittacula are feathered creatures, while ornithorhynchus is a vertebrate. Pavo and Psittacual are birds, where as ornithorhynchus is mammal. Hence, (b) one is odd.

780. Non-chordates have :
(a) notochord
(b) dorsal tubular nerve chord
(c) pharyngeal gill slitsS
(d) absence of hepatic portal system

BCECE-2005

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Ans. (d) : Non chordates are characterised by the absence of notochord, pharyngeal gill slits and anal tail.
• Nerve cord in them is double and placed ventrally. Pharyngeal gill slits and the hepatic portal system is also absent in non chordates. Chordates are characterised by the presence of a notochord, dorsal hollow nerve cord, pharyngeal gill slits and a post-anal tail. They have a ventral heart.

781. Which of the following is the characteristic of chordata?
(a) Body is triploblastic
(b) Blind sac body plan
(c) Dorsal hollow nerve cord
(d) Canals and spongocoel are lined by flagellated cells

UP CPMT-2010

Ans. (c) : The phylum chordata is characterized by the presence of a notochord, a dorsal hollow nervecord, pharyngeal gill-slits and a post anal tail. Chordates are triploplastic animals as they have 3 embryonic layer-
(i) ectoderm
(ii) mesoderm
(iii) endoderm
The blind sac body plan is seen in Coelenterates. In porifera. The canal and spongocoel is lined with flagellated cells called choanocytes.

782. The mullerian duct in the female amniotes develops into
(a) Oviduct (b) Ureter
(c) Uterus (d) Seminal receptacle

VMMC-2013

Ans. (a) : The mullerian duct, named after the german physiologist 'Johamas P-Muller' in the embryo becomes the oviduct in the adult female. The Mullerian Duct (MD) which is also called as 'Paramesonephric duct' is the embryonic structure that develops into the Female Reproductive Tract (FRT). They have paired ducts of mesodermal origin in the embryo.

783. All chordates at one or other stage possess
(a) two pairs of pentadactyl limbs
(b) pharyngeal gill slits
(c) movable jaw
(d) vertebral column

MGIMS Wardha-2014

Ans. (b) : In all the chordates, at some stage of their life history, a series of paired lateral gill clefts or gill slits perforate through the pharyngeal wall of the gut behind the mouth.
• They serve primarily for the passage of water from pharynx to outside.

784. Equus rests on
(a) one digit (b) three digits
(c) four digits (d) five digits

Manipal-2011

Ans. (a) : Equus is a genus of mammals in the family Equidae, which includes horses, asses and zebras within the Equidae. Equus is the only recognised extant genus comprising seven living species. Equines are odd toed ungulates with slender legs, long heads, relatively long necks, manes and long tails. The earleast horses had three or four functional toes. But over millions of years of evolution many horses lost their side toes and developed a single hoof. Only horses with single toed (digit) hooves survive today.
The present species of horse (Equus) has one digit only in its toe. As the species evolved horses gradually dropped their digit number down to four, three and then just one.

785. The character which distinguishes vertebrate from other chordates is:
(a) dorsal heart
(b) solid ventral nerve cord
(c) hollow dorsal nerve cord
(d) presence of cranium

JIPMER-1998

Ans. (d) : The four most prominent characteristics that distinguish chordates from species in all other phyla are the presence of a post-anal tail, a notochord, a dorsal, hollow nerve cord, and pharyngeal slits (also called gill slits).
• Vertebrates are the only chordates that have a brain as part of their central nervous system. It shows the presence of cranium.

786. The portal system seen in all vertebrates is:
(a) hepatic (b) renal
(c) both (a) and (b) (d) pulmonary

JIPMER-1997

Ans. (a) : Hepatic portal system is present in all vertebrates.
• The hepatic portal system consists of the hepatic portal vein, inferior mesenteric vein, superior mesenteric vein, and gastrosplenic vein.
• The superior mesenteric vein and the gastrosplenic vein come together to give rise to the hepatic portal vein.
The renal portal system is absent or lacking in mammals.

787. Most of the cartilages in vertebrate embryo are replaced in adult by
(a) Blood (b) Bones
(c) Tendons (d) Ligaments
(e) Muscles

Kerala PMT-2015

Ans. (b) : Most of the cartilages in vertebrate embryo are replaced in adult by bones. In vertebrate embryo, most of the skeleton is made up of cartilage, which is eventually replaced by bone during growth. Cartilage is a specialized type of dense connective tissue designed to give support, bear weight and withstand tension, torsion and bending.

788. Which vertebrate organ receives only oxygenated blood?
(a) Gill (b) Lung
(c) Spleen (d) Liver

JIPMER-2003

Ans. (c) : The spleen is the organ that receives only oxygenated blood. The splenic artery or lineal artery is the blood vessel that supplies oxygenated blood to the spleen. It branches from the celic artery.
• Gills & lungs are respiratory organs that oxygenate deoxygenated blood.
• The liver receives deoxygenated blood, through the hepatic portal system.

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789. Feature of acraniate vertebrates are :
(a) median and paired fins, 7 gill slits and acoelous vertebral column
(b) paired fin,5 gill slits, coelous vertebral column
(c) median fin, 7 gill slits, acoelous vertebral column
(d) median fin, 5 gill slits and coelous vertebral column

Rajasthan PMT-1998

Ans. (c) : Acraniata are lower chordates that possess a cranium and belong to the phylum chordata.
• They possess a notochord and gill slits are persistent.
• They possess acoelous vertebral column.
• The whole body is segmented, head section is not separate. They possess a dorsal fin. They also have median fin, 7 gill slits, acoelous vertebral column.

790. Which of the following pair include oldest and primitive vertebrates?
(a) Amphioxus and Herdmania
(b) Doliolum and Scoliodon
(c) Balanoglossus and Salpa
(d) Petromyzon and Myxine

Rajasthan PMT-1998

Ans. (d) : Petromyzon and Myxine are oldest and primitive vertebrates. Petromyzon (lamprey) are example of cyclostomes which are also considered as lower vertebrates that is an ectoparasite on other vertebrates. Cyclostomes are jawless vertebrates.
Myxine belongs to the genus of hagfish and belongs to the class cyclostomata. It has a shape like an eel fish.

791. Which one of the following is not an example of accretionary growth?
(a) Increase in the size of muscles due to regular exercise
(b) Prenatal growth of the embryo
(c) Both of the above
(d) None of the above

AMU-2011

Ans. (c) : The accretionary growth can be seen in bone and cartilage. The accretionary growth occurs in the adult stage. It also occurs during the post-embryonic stage. This type of growth occurs when cells become permanent.
In this type cells lose their capacity to divide so there will be necessity of secretion of extracellular matrix for growth.
• In auxetic growth the organism size increase due to cellular enlargement. Auxesis refers to growth from an increase in cell size rather than an increase in the number of cells.

792. In vertebrates the nerve growth factor occurs in the
(a) Salivary secretions (b) Gastric secretion
(c) Pancreatic secretion (d) Lacrymal secretion

AMU-1998

Ans. (a) : Nerve growth factor and its different precursor forms are secreted into human saliva by salivary glands and are also produced by an array of cells in the tissues of the oral cavity. The nerve growth factor (NGF) is a protein growth factor that is necessary for the growth and maintenance of sympathetic neurons and some sensory neurons.

793. Any one of the following set of characters is definetely found at some stage in the life cycle of a chordate:
(a) mammary glands, hair, gill cleft
(b) notochord, gill-cleft, dorsal tubular nervous system
(c) notochord, vertebral column, gill- cleft
(d) dorsal tubular nervous system, vertebral column, scales

VMMC-2006

Ans. (b) : Presence of notochord, dorsal tubular nerve cord, pharyngeal gill clefts, post and anal tail, RBCs and hepatic portal system is distinguishing feature of chordates.
• Solid tubular ventral nerve cord is not a characteristic of phylum chordata.

794. Order Primata contains
(a) shrew and hedge hog (b) bats and vampire
(c) monkeys and man (d) horses and zebra

UP CPMT-2001

Ans. (c) : Primates is an order that includes a diversified group of animals such as lemurs, lorises, monkey, ape and humans.
Primates have large brain (relative to body size) compared to other mammals.
Some primates also have opposable thumbs.

795. Which of the following statements is true?
(a) All chordates are vertebrates
(b) All vertebrates are chordates
(c) Invertebrates possess a tubular nerve cord
(d) Non-Chordates have a vertebral

Karnataka CET-2003

Ans. (b) : Vertebrata is a Sub-phylum under phylum chordata in which, the embryonic notochord gets replaced by a bony or cartilaginous vertebral column in the adult.
• All vertebrates are chordates but all chordates are not vertebrates.
Characters that they share with vertebrates at some point in their lives are- A notochord (become spinal cord), Pharyngeal pouches (becomes inner ear and jawbone in humans) Dorsal hollow nerve chord (becomes vertebral column).

796. Animals having a built in thermostat to maintain constant body temperature are known as
(a) Biothermic (b) Poikilothermic
(c) Oligothermic (d) Homeothermic

VMMC-2012

Ans. (d) : Homeothermy refers to thermoregulation that maintains a stable internal body temperature regardless of external influence.
• Higher chordates such as birds and mammals are examples of homeotherms or warm blooded animals(endotherms).
• Poikilothermic- An organism that cannot regulate its body temperature. They are also called cold-blooded animals.
Biothermic- These are the organism which have the ability to respond to the outer cold temperature by continuous shivering so as to produce heat in their body.
Oligothermic- These are the creatures which can bear relatively low temperature in the environment.

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797. The Salientia member with digits of fore limbs and hind limbs webbed is:
(a) Rana (b) Rhacophorus
(c) Proteus (d) Hyla

AP EAMCET-2004

Ans. (b) : The Salientia are a total group of amphibians that includes the order Anura. They include the frogs and toads and various extinct proto-frogs.
• The hind limbs help in swimming, walking and burrowing. The hind limbs comprise of five digits and they are larger and muscular than fore limbs that end in four digits. feet have webbed digits that help in swimming.

798. Which of the following is not present in all the chordates?
(a) Vertebral column
(b) Notochord
(c) Dorsal tubular nerve cord
(d) None of these

JIPMER-1995

Ans. (a) : Chordates include Urochordates, Chephalochordates (both are called protochordate.) and vertebrates.
• In vertebrates notochord is replaced by the vertebral column (back bone).
• However, the vertebral column is not present in a protochordate.

799. Which of the given option is correct regarding the statements?
Statement I Cephalochordata bears notochord all along the body throughout life.
Statement II Urochordate bears vertebral column only in tail region throughout the life.
(a) I wrong, II correct
(b) I correct, II wrong
(c) Both I and II are wrong
(d) Both are correct

JIPMER-2013

Ans. (b) : Cephalochordata bear notochord all along the body throughout life.
Cephalochordates have a hollow, dorsal nerve cord pharyngeal gill slits and a notochord.
• Urochordates bear notochord in the tail region in their larval stage only. Hence, statement second is wrong.

800. The scientific name of gharial is
(a) Naja bungarus
(b) Gavialis gangeticus
(c) Hemidactylus flavivridis
(d) None of the above

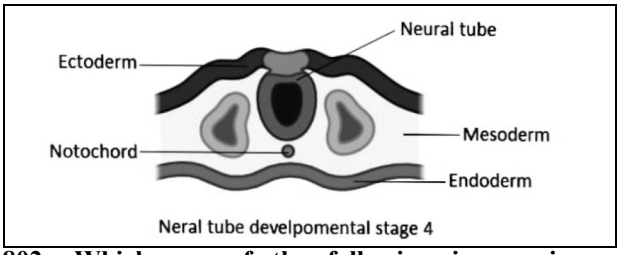
JIPMER-2013

Ans. (b) : The gharial (Gavialis gangeticus) also known as gharial or fish-eating crocodile, is a crocodilian in the family Gavialidae and among the longest of all living crocodilians.

801. Notochord originates from
(a) mesoderm (b) ectoderm
(c) endoderm (d) None of these

JIPMER-2013

Ans. (a) : : The notochord develops ventral to ectoderm and this means it originates from mesoderm.
• First, it lies below the ectoderm then below the neural plate, and finally under the neural tube.



Neral tube develpomental stage 4

802. Which one of the following is a primary character of phylum-Chordata ?
(a) Solid ventral nerve cord
(b) Dorsal tubular nerve cord
(c) Paired nerve cord
(d) Ganglionated nerve cord

VMMC-2015

Ans. (b) : The presence of dorsal nerve chord is a characteristic feature of all chordates but this nerve chord is hollow in nature so that neuron can pass through and present below the dosal part.

803. Presence of claspers is an important character in
(a) Sphyrna (b) Echeneis
(c) Hippocampus (d) Exocoetus

CG PMT-2011

Ans. (a) : Presence of claspers is an important character in 'Sphyrna' . Sphyrna are also known as hammer headed sharks.
This aquatic organism belongs to the phylum chordata and class-chondrichthyes.
• It is a cartilaginous fish. The males can be distinguished from the female, since the male possesses a pair of hard elongated claspers attached to the pelvic fins.

804. Which of the following is a species?
(a) Dipnoi (b) Mammalia
(c) Canis familiaris (d) Carnivora

CG PMT-2011

Ans. (c) : *Canis familiaris* is a species of dog . The scientific name of a dog is *Canis familiaris.*
Dipnoi – Dipnoi is a sub-class of bony fishes comprising the lungfishes.
Mammalia – Class - Mammalia is a higher vertebrates that nourish their young with milk secreted by mammary glands.
Carnivora – Carnivora is an order of placental mammals that have specialized in primarily eating fish.

805. Retrogressive metamorphosis is present in
(a) Herdmania (b) Balanoglossus
(c) Amphioxus (d) All of these

VMMC-2010 / Rajasthan PMT-2006 / AMU-1998

Ans. (a) : Retrogressive metamorphosis is present in herdmania. Retrogressive metamorphosis refers to a specific type of metamorphosis observed in ascidians or tunicates, which are a type or urochordate. Metamorphosis is a process in which an organism undergoes a profound, change in form during post-embryonic development, typically transitioning from a larval stage to an adult stage. In retrogressive metamorphosis the larva possesses advanced characteristics that are subsequently lost or degenerate as it transforms into the adult stage.

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806. Which animal notochord possesses throughout its life?
(a) Fish (b) Bird
(c) Snake (d) Amphioxus

HP CET-2012

Ans. (d) : The notochard in amphioxus consist of parallel notochard cell and each plate consist of parallel thinner & fibril.
Amphioxus belongs to the phylum chordata (subphylum cephalochordata). In amphioxus, the notochord persist throughout the life.

807. The heart of molluscs and vertebrates are of
(a) neurogenic type
(b) myogenic type
(c) partially myogenic type
(d) partially neurogenic type

CMC Ludhiana -2013

Ans. (b) : The myogenic heart is a characteristic feature of molluscs and vertebrates.
In this type of heart, the heartbeat is initiate by a patch of the modified heart muscle known as SA node.

808. Two chambered heart is a feature of
(a) Amphibians (b) Fishes
(c) Reptiles (d) Birds
(e) Mammals

Kerala PMT-2009

Ans. (b) : Two chambered heart is a feature of fishes.
Fish have a two-chambered heart. It comprises an atrium and a ventricle. Auricle is responsible for taking in blood from body and ventricle pumps out the blood that has entered the heart through gills.
- Amphibians have a 3 chambered heart.
- Reptiles have an incompletely four chambered heart
- Birds have a 4-chambered heart.
- Mammals have a 4-chambered heart. It is composed of two atria and two ventricles.

809. Statement (S) : Marine fishes have aglomerular kidneys
Reason (R) : Aglomerular kidneys increase the loss of water through urine
Correct choice is
(a) Both (S) and (R) are correct but (R) is not the correct explanation to (S)
(b) Both (S) and (R) are correct and (R) is the correct explanation to (S)
(c) (S) is wrong but (R) is correct
(d) (S) is correct but (R) is wrong

TS EAMCET-2015

Ans. (d) : Approximately 40 species of fish are known to possess aglomerular kidneys representing as 0.1% of extant fish species. So, the statement is correct but the reason is not correct because aglomerular kidneys does not increase the loss of water through urine.

810. Pharyngeal gill-slits are found in
(a) Octopus (b) crayfish
(c) dogfish (d) cuttlefish

Uttarakhand PMT-2011

Ans. (c) : Dogfish are chordates. They have pharyngeal gill slits. Pharyngeal gill slits are one of the primary characters of chordates.
- Octopus also called 'Devil fish' belongs to phylum mollusca.
- Cuttlefish belongs to phylum mollusca.
- Cray fish are fresh water crustaceans which belongs to phylum Arthropoda.

811. Which one of the following is a true fish?
(a) Star fish (b) Dog fish
(c) Jelly fish (d) Cuttle fish

UP CPMT-2013

Ans. (b) : Dogfish is a cartilagenous fish. It is also known as Scoliodon. Because of its great sense of smell it is known as dogfish.
- Jelly fish is a Coelenterates.
- Star fish belongs to phylum Echinodermata.
- Cuttlefish belongs to phylum Mollusca.

812. Statement (S) : Lancelets are jawless, primitive fish like vertebrates.
Reason (R) : In lancelets notochord, tubular nerve cord and pharyngeal gill slits are present throughout their life.
The correct answer is
(a) Both (S) and (R) are correct and (R) is not the correct explanation to (S)
(b) (S) is correct but (R) is wrong.
(c) (S) is wrong but (R) is correct
(d) Both (S) and (R) are correct and (R) is the correct explanation to (S).

AP EAMCET-2014

Ans. (c) : Lancelets are not vertebrates, cilia driver currents 'suck' water into the mouth and across the pharyngeal gills. A lancelet has a long body, pointed at both ends, with a large notochord that extends almost from tip to tip and is persist throughout life.
Thus, statement (S) is wrong but the reason (R) is correct.

813. A jawless fish, which lays eggs in fresh water and whose ammocoetes larvae after metamorphosis return to the ocean is :
(a) Petromyzon (b) Eptatretus
(c) Myxine (d) Neomyxine

AIPMT (Re-Exam)-2015

Ans. (a) : Petromyzon (lamprey) belongs the class Agnatha of the subphylum vertebrate, is a migratory marine water jawless fish which shows anadromous migration.
It spawns in fresh water, stop feeding and dies.
Its larva (Ammocoetes) after metamorphosis will return to ocean.
Some of the characteristic of Agnatha are :-
- Jaws are absent.
- Paired fins are generally absent.
- Early species had heavy bony scales and plates in their skin, but these are not present in living species.
- The embryonic notochord persists in the adult
- In most cases skeleton are cartilaginous
- Seven or more paired gill pouches are present.

814. The chordate features shared by the non-chordates are
(a) Bilateral symmetry
(b) Triploblastic condition and bilateral symmetry
(c) Metamerism
(d) All of the above

AIIMS-2011

@apna_pdf

Ans. (d) : The chordates features shared by the non chordates animals are– bilateral symmetry, triploblastic condition and metamerism. These are common features which are common to both chordate and non chordates.

815. A chordate character is
(a) gills (b) spiracles
(c) post-anal tail (d) chitinous exoskeleton

AIPMT-1989

Ans. (c) : Chordate character are notochord, pharyngeal gills slits, nerve cord and post anal tail.
Tail is the part of the body behind the cloacal or anal opening . The tail is reduced or absent in the adult of some chordates.

816. What is common in whale, bat and rat?
(a) Absence of neck
(b) Muscular diaphragm between thorax and abdomen
(c) Extra-abdominal testes to avoid high temperature of body
(d) Presence of external ears

AIPMT-1993

Ans. (b) : Bat, whale and rat is the presence of a muscular diaphragm between thorax and abdomen. The diaphragm separates the thoracic from the abdominal cavity. Whale, bat and rat all are mammals and have diaphram.

817. Among the following organisms point out a completely non-parasitic form
(a) Tapeworm (b) Mosquito
(c) Sea anemone (d) Leech

AIPMT-1994

Ans. (c) : A parasite is an organism that lives on other organism and obtain food, cousin harm, or in (host). Sea anemone is non parasite; it shows mutualism with hermit crab. Mosquito, leech & tapeworm are parasites.

818. A common characteristic of all vertebrates without exception is
(a) the division of body into head, neck, trunk and tail
(b) their body covered with an exoskeleton
(c) the possession of two pairs of functional appendages
(d) the presence of well-developed skull

AIPMT-1994

Ans. (d) : A common characteristic of all vertebrates is the presence of a well-developed skull. This bony structure encases and protects the brain, which is a critical organ in all vertebrate species. The skull also provides attachment points for muscles and serves as a framework for the sensory organs such as the eyes, ears and nose.

819. Besides annelida and arthropoda, the metamerism is exhibited by
(a) mollusca (b) acanthocephala
(c) cestoda (d) chordata

AIPMT-1995

Ans. (d): Metamerism is the repetition of homologous body segments. Animals included in the phylum Annelida, Arthropoda and chordata show true metamerism. In chordates, the segmentation is apparent only in the embryonic stage.

820. Match the following and choose the correct option :

(i) Cyclostomes	**(A) Hemichordata**
(ii) Aves	**(B) Urochordata**
(iii) Tunicates	**(C) Agnatha**
(iv) Balanoglossus	**(D) Pisces**
(v) Osteichthyes	**(E) Tetrapod**

(a) i – A ii – B iii – C iv – D v – E
(b) i – B ii – C iii – D iv – A v – E
(c) i – C ii – E iii – B iv – A v – D
(d) i – C ii – A iii – E iv – B v – D
(e) i – E ii – C iii – B iv – A v – D

BVP-2015 / JIPMER-2013 / Kerala PMT-2011

Ans. (c) :

(i)	Cyclostomes	Agnatha
(ii)	Aves	Tetrapod
(iii)	Tunicates	Urochordata
(iv)	Balanoglossus	Hemichordata
(v)	Osteichthyes	Pisces

821. Which of the following is not found in vertebrates?
(a) Bilateral symmetry (b) Gill opening
(c) Body scales (d) Cnidoblasts

WB JEE-2007

Ans. (d) : Cnidoblasts are not found in vertebrates. These specialize cells contain structure called cnidocysts, which are used by certain animals like jellyfish and corals for defense and capturing prey. Vertebrates do not possess these cells or structures.

822. Vertebrate nails are derivatives of:
(a) stratum lucidum (b) stratum germinatirum
(c) stratum granulosum (d) stratum corneum

MP PMT-2013

Ans. (d) : Vertebrate nails are derived from the stratum corneum, which is the outermost layer of the skin. This layer becomes thickened and hardened to form nails.

823. When embryonic development is completed is mother but the embryo not accept-nutritent from mother. Which is know is :
(a) ovo-viviparous (b) viviparous
(c) oviparous (d) all of these

Rajasthan PMT-1999

Ans. (a) : Ovo-viviparous animals are those who fertilize the egg internally & then hatch the egg inside the mother's body in the mother's womb. The mother retains the egg in the oviduct for a certain time until they all fully developed to be laid outside and survive in the external environment. This is seen in sharks and ray fish.

824. The most primitive vertebrates are
(a) Ostracoderms (b) Cephalochordates
(c) Placoderms (d) Cyclostomes

BVP-2009
VMMC-2009
Uttarakhand PMT-2009

Ans. (a) : Ostracoderms are considered the most primitive vertebrates. They were jawless fish that lived around 500 million years ago. They had bony armor covering their bodies and lacked true jaws. This makes them one of the earliest examples of vertebrates in the fossil record.

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825. Identify the pair having amphicoelous vertebrae
(a) Scoliodon and Ichthyophis
(b) Crocodylus and Hemidactylus
(c) Ornithorhynchus and Macropus
(d) Ophiophagus and Tropidonotus

TS EAMCET-15.05.2016

Ans. (a) : Amphicoelous vertebra is a type of vertebrae in which the centrum of the vertebrae is concave on both anterior surface and posterior surface. This type of vertebrae is found in scoliodon and Ichthyophis.

826. Which one is not a vertebrate?
(a) Fish (b) Sparrow
(c) Oryctolagus (d) Amphioxus

BVP-2011

Ans. (d) : Amphioxus is not a vertebrate. It is cephalo-chordata which is included in phylum chordate. Amphioxus also called lancelet.

827. Given below are four matchings of an animal and its kind of respiratory organ.

(I)	**Silver fish**	**Trachea**
(II)	**Scorpion**	**Book lung**
(III)	**Sea squirt**	**Pharyngeal slits**
(IV)	**Dolphin**	**Skin**

Correct option:
(a) II and IV (b) III and IV
(c) I and IV (d) I, II and III

Manipal-2015

Ans. (d) : They rise to the water's surface to inhale air through their blowholes, which are essentially nostrils located at the back of their heads.

828. Which one of the following pairs is mismatched?
(a) Pila globosa - Pearl (b) Apis indica - Honey
(c) Kenia lacca - Lac (d) Bombyx mori - Silk

Rajasthan PMT-2010

Ans. (a) : Pearl is mismatched because pila globosa is a species of freshwater snail, where as pearls are typically produced by oysters or mussels. The other pairs correctly associate the respective organisms with their products.

829. Choose the correct statement.
(a) All mammals are viviparous
(b) All cyclostomes do not possess jaws and paired fins
(c) All reptiles have a three-chambered heart
(d) All pisces have gills covered by an operculum

NEET-2016 Phase-II

Ans. (b) : Cyclostomes are Agnathans organisms, they lack both jaws and paired fins.
- Most mammals are viviparous except platypus (Ornithorhynchus) and Echidna (Tachyglossidae) which are oviparous mammals.
- All reptiles have three chambered heart except crocodile which have four chambered heart.
- Bony fishes have gills covered by operculum but cartilaginous fishes do not.

830. The missing link between amphibians and reptiles is
(a) Archaeopteryx (b) Ichthyostega
(c) Seymouria (d) All of these

Punjab MET-2007

Ans. (c) : The missing link between amphibians and reptiles is seymouria. It is a genus of extinct amphibians-like animals that lived during the late carboniferous and early Permian periods. It is considered to be a transitional form between amphibians and reptiles due to its combination of amphibian and reptilian features. This makes it an important evolutionary link in the transition from water-dependent amphibians to more terrestrial reptiles.

831. Retractile claws are found in:
(a) Cat and Lion (b) Leopard
(c) Hyaena (d) All of the above

MP PMT-2013

Ans. (d) : Retractile claws are present in various animals including cats, lions, leopards and hyenas. There claws can be extended and retracted, allowing these animals to control their use for hurting, climbing and other activities.

832. Connecting link between bird and Reptiles is :
(a) Dodo (b) Kiwi
(c) Panguine (d) Archaeopteryx

Rajasthan PMT-1999

Ans. (d) : Archaeopteryx is Connecting link between bird and Reptiles.
Archaeopteryx was a primitive bird with feathers, but its fossilized skeleton looks more like that of a small dinosaur.
- It was about the size of a magpie unlike modern bird it had a full set of teeth a long bony tail and three claws on its wing which may have been used for grasping branches.

833. The ability of animals to regenerate the lost parts of the body was reported by
(a) Carlson (b) Trembley
(c) Patten (d) Storer

CG PMT-2004

Ans. (b) : The ability of animals to regenerate the lost part of the body was reported by trembley.

834. Crocodile and Penguin are similar to Whale and Dogfish in which one of the following features
(a) Have gill slits at some stage
(b) Possess a solid single stranded central nerovous system
(c) Lay eggs and guard them till they hatch
(d) Possess bony skeleton.

AIPMT (Mains)-2010

Ans. (a) : Crocodile, Penguin, Whale and Dogfish belongs to phylum chordates represents that they have similar limb structure but their functions may varies, they have gill slits at embryonic stage of life. They all are viviparous and produces young once.
The presence of a notochord, a dorsal hallows nerve cord and paired pharyngeal gill slits are also a character of chordates.

835. The post anal tail is present in-
(a) Invertebrates (b) Vertebrates
(c) Chordates (d) In all of them

Karnataka CET-2007

Ans. (c) : Post anal tail is a exclusive key feature of chordates. Post and tail is an extention of the body beyond the anus and helps in several functions like locomotion, balance etc.

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836. What is common between parrot, platypus and kangaroo?
(a) Ovoparity (b) Homeothermy
(c) Toothless jaws (d) Functional post-anal tail

AIPMT-2007

Ans. (b) : Homoeothermy is the maintenance by an animal in which body temperature remains constant and does not change with the change of environmental temperature.
- Homoeothermy occurs in birds and mammals which are described as endotherms.
- Kangaroo is a oviparous animal and has jaw with tooth.
- Parrot, platypus has toothless jaws.
- In kangaroo functional post-anal tail is found.

837. Which one of the following is not a vertebrate?
(a) Sea cow (b) Sea lion
(c) Sea horse (d) Sea hare

JIPMER-2014

Ans. (d) : An invertebrate is a cold-blooded animal without a backbone. They can live both on land and water. Sea hare is commonly known as sea slug. They belong to phylum molluscs. They are marine gastropods.

838. Both hepatic and renal portal systems are found in
(a) Fishes, Amphibians, Reptiles
(b) Amphibians, Reptiles, Mammals
(c) Reptiles, Aves, Mammals
(d) Cyclostomes, Fishes, Amphibians

AP EAMCET-2013

Ans. (a) : In fishes, amphibians and reptiles both hepatic and renal portal system are found.
- A hepatic portal system is a system of veins that carries blood from the digestive tract to the liver.
- A renal portal system is a system of veins that carries blood from the kidneys to the liver.
- In mammals, only the hepatic portal system is present.

839. Renal portal system is
(a) present in all vertebrates
(b) present in all chordates
(c) absent in mammals
(d) present in all mammals

JCECE-2014 / UP CPMT-2006

Ans. (c): Renal portal system is well developed in fishes and amphibians, reduced in reptile and bird and is absent in mammals. This system carries blood from the posterior region of the body to the kidney by renal portal vein.

840. A circulatory system which is formed by capillaries and ends with capillaries is
(a) renal
(b) hepatic
(c) double circulatory system
(d) portal circulation

UP CPMT-2006

Ans. (d): A portal system can be defined as a part of the systemic circulation. A circulator system which is formed by capillaries and ends with capillaries is called as portal circulatory system.
Renal Portal System - A renal portal system is a portal venous system found in all living vertebrates except for hagfish lampreys and mammals. Its function is to supply blood to renal tubules.
Hepatic Portal System - Occurs in all vertebrates and is meant for taking blood from digestive tract pancreases and spleen into liver.
Double Circulatory System - Consist of pulmonary circulation (movement of blood between heart and lung) and systemic circulation (movement of blood between heart and different part of body except long).

841. Heart of elephant is
(a) neurogenic (b) myogenic
(c) both (a) and (c) (d) None of these

UP CPMT-2002

Ans. (b) : The heart of elephant is myogenic in nature. Mygenic heart does not require neural input to beat. The character of this type heart is closed type, mostly present in human body.
Neurogenic– In this type of heart the open type of circulatory system is present. A neurogenic heart beates by nerve impules, mostly present in lower invertebrates like annelids and insects.

M. Urochordata

842. Pick up the organism that emits light
(a) Pyrosoma (b) Mytilus
(c) Pontobdella (d) Aplysia

TS EAMCET-28.09.2020 Shift-I

Ans. (a) : Pyrosomes is the organism that emits light. It is capable of bioluminescence, a phenomenon where it produces and emits light. This ability to glow is a fascinating aspect of pyrosoma's biology.

843. In which among the following animals, retrogressive metamorphosis is found?
(a) Vertebrata (b) Urochordata
(c) Invertebrates (d) Chordates

AIIMS-2017 / AIIMS-2016 / WB JEE-2010

Ans. (b) : Urochordata possesses a unique feature called **retrogressive metamorphosis**. In this type of metamorphosis, an active larva metamorphoses into a sedentary (adult) phase.
- Metamorphosis is the phenomena in which there are converts which transform the organism from its juvenile stage (initial stage) to adult stage (end stage).
- They belong to the group of Urochordates also known as **Tunicates**.
- Tunic is a compound which form protective covering and animals are called tunicate. Tunic is produce by tunicates which are similar to cellulose which contain the cellulose micro fibrils.

E.g. **Herdmania**.

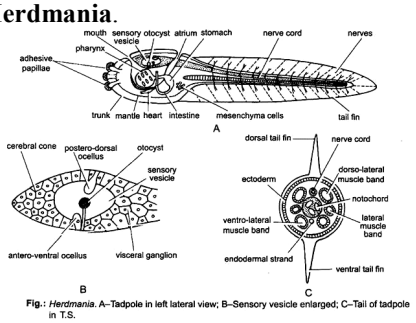

Fig.: *Herdmania*. A–Tadpole in left lateral view; B–Sensory vesicle enlarged; C–Tail of tadpole in T.S.

@apna_pdf

844. At retrogressive metamorphosis the uro chordate larva
(a) loss of notochord
(b) loss of tail
(c) experience reduction of nervous system to a visceral ganglion
(d) all of the above

JCECE-2007

Ans. (d) : Retrogressive metamorphosis in urochordate larvae involves the loss of the notochord, loss of the tail and reduction of the nervous system to a visceral ganglion. This process leads to a simpler anatomical structure as the larva matures into an adult form.

845. Mode of feeding in tunicates is :
(a) acrophagus (b) parasitic
(c) ciliary (d) myxotrophic

Uttarakhand PMT-2010

Ans. (c) : The mode of feeding in tunicates are ciliary or filter type. Tunicates are suspension feeders, means they feed by filtering plankton and other small food particles from the water. They are commonly known as sea squirt.

846. Outer covering of tunicates is formed by :
(a) tunicin (b) cellulose
(c) chitin (d) all of these

Rajasthan PMT-1999

Ans. (a) : The outer leathery covering in tunicates is formed of cellulose like substance called tunicin.
It acts as exoskeleton.
The body covered by the test it formed by tunicin. It protects from predators like sea star snail and fishes.

N. Cephalochordata

847. The protochordate that doesn't have heart, respiratory pigment, blood corpuscles but performs respiration through the external body surface is ————
(a) Oikopleura (b) Doliolum
(c) Branchiostoma (d) Pyrosoma

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : Branchiostoma is a lancelet, a type of choradata that is closely related to vertebrates. It has a notochord, a dorsal hollow nerve chord, and pharyngeal slits. However, it does not have heart respiratory pigment, or blood corpuscles. It respires through its external body surface.

848. The outermost covering of the egg of housefly is
(a) chitin (b) chorion
(c) vitelline membrane (d) plasma membrane

Uttarakhand PMT-2011

Ans. (b) : The hard outer covering of the egg of housefly is known as chorion. The chorion is made up of chitin, a strong, flexible material that is also found in the exoskeleton of insects.

849. Solenocytes are associated with
(a) respiration (b) digestion
(c) excretion (d) nutrition

JIPMER-2008

Ans. (c) : Solenocytes are flagellated cells involved with excretion, ion regulation and osmoregulation in some chordates which belongs to the subphylum Cephalochordata. It is a cup shaped cell that includes group of cilia and this is the main excretory organ of platyhelminthes. In lower vertebrates solenocytes removes the nitrogenous wastes.

850. Persistent notochord is the feature of which among the following?
(a) Chondrichthyes (b) Cyclostomata
(c) Loa loa (d) None of these

BCECE-2015

Ans. (b) : Cyclostomata have a persistent notochord through out of life vertebral column is small imperfect neural arches over the notochord.

851. An animal which has a notochord throughout its life:
(a) fish (b) Amphioxus
(c) bird (d) snake

AP EAMCET-1998
VMMC-2004

Ans. (b) : An animal has a notochord throughout its life is amphioxus. Amphioxus are small marine animals found widely in the coastal water of the warmer parts of the sea and less commonly in temperate water. Amphioxus belongs to the group of cephalochordates.

852. Which of the following is not the example of marine fishes?
(a) Labeo (b) mugil
(c) Hilsa (d) Sardines

WB JEE-2006

Ans. (a) : Marine fishes are the fishes that lives in ocean water. They are also called as salt water fishes, ex. Hilsa, Mugil and Sardines.
• Labeo rohita is a freshwater fish. They are found in rivers and ponds.

853. The devil fish and sea hare are
(a) Mollusca
(b) Crustaceans
(c) Coelenterates
(d) Marine fish and mammal

J&K CET-2008

Ans. (a) : Phylum mollusca including devil fish and sea hare. Among the genus of mollusca largest fish is the Devil. These can be found in the Eastern Atlantic Ocean, south of the Portugal and possibly in the northwest Atlantic. Scientific name of sea hare is Dalabella auricularia. They often hide in seagrass, sand and mud to protect themselves and live in areas that are sheltered from rough currents.

854. Notochord is present in the larva of :
(a) Herdmania (b) Cephalodiscus
(c) Balanoglossus (d) Amphioxus

Rajasthan PMT-1998

Ans. (a) : In Urochordata retrogressive metamorphosis is seen.
- Herdmania is an urochordatates animals. In urochordata, the notochord is present only in the larval tail.
- Balanoglossus is a genus of ocean-dwelling acorn worm

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855. Statement 1 : Cephalochordata bears noto – chord all along the body throughout life. Statement 2 : Urochordate bears vertebral column only in tail region throughout the life. Which statement is correct?

(a) Both 1st and 2nd are correct
(b) 1st correct, 2nd wrong
(c) 1st wrong, 2nd correct
(d) Both 1st and 2nd are wrong

J&K CET-2006

Ans. (b) : Cephalochordates and vertebrates have a hollow dorsal nerve cord, pharyngeal gill slits and notochord .

■ **Cephalochordates** have notochord all along the body throughout the life.

■ The notochord is retained into adulthood and is never replaced by vertebrae.

■ **Urochordates** have notochord in the tail region in their larval stage only.

856. Presence of notochord throughout the life and length of the body is a feature of:

(a) Urochordates (b) Invertebrates
(c) Vertebrates (d) Cephalochordates

VMMC-2014
AP EAMCET-2001

Ans. (d) : The presence of Notochord is a Mesodermally derived, an preserved flexible solid rod of turgid cells present in chordates.

• It the members of the class cephalochordata notochords are persistent for their lifetime along the whole length of their body.

857. Find the wrongly matched pair,

Animal		Excretory organ/Structure
(a) Balanoglossus	-	Proboscis gland
(b) Earthworm	-	Nephridia
(c) Grasshopper	-	Malphigian tubules
(d) Prawn	-	Flame cells
(e) Amphioxus	-	Protonephridia

Kerala PMT-2015

Ans. (d) :

Balanoglossus	-	Proboscis gland
Earthworm	-	Nephridia
Grasshopper	-	Malphigian tubule
Prawn	-	Green gland
Amphioxus	-	protonephridia

O. Cyclostomata

858. Select the incorrect statements with respect to Cyclostomes:

(A) They lack scales and paired fins.
(B) They have circular mouth with jaws.
(C) They bear 6-15 pairs of gills.
(D) They migrate to deep sea for spawning.
Choose the most appropriate answer from the options given below:

(a) (A) and (B) only (b) (B) and (C) only
(c) (B) and (D) only (d) (A) and (D) only

NEET (Re-Exam)-04.09.2022

Ans. (c) : Cyclostomes is a group of vertebrates

- Circular mouth without jaws.
- The word cyclostomata means rounded mouths.
- Lampreys. Hagfishes both groups have round mouths that do not have jaws, however they have teeth.
- Cyclostomates are marine vertebrates but they show migration of fresh water for process of spawning.

859. Match the name of the animal (column I), with one characteristics (column II), and the phylum/class (column III) to which it belongs:

	Column I	Column II	Column III
(a)	Adamsia	radially symmetrical	Porifera
(b)	petromyzon	ectoparasite	Cyclostomata
(c)	Ichthyophis	terrestrial	Reptilia
(d)	Limulus	Body covered by chitinous exoskeleton	Pisces

NEET-2013

Ans. (b) : Petromyzon is an ectoparasite fish belonging to cyclostomata. They are belong to cyclostomata.

860 . Parents of ammocoete larva show

(a) Paired fins
(b) Placoid scales
(c) Catadromous migration
(d) Anadromous migration

AP EAMCET-2016

Ans. (d) : Ammocoete is the larval stage of the lamprey. Lampreys are anadromous fish, which means that they migrate from the ocean to freshwater to spawn. The parents of ammocoete larvae will also be anadromous fish.

861. Branch of zoology dealing with the study of fishes is called

(a) Arthrology (b) lchthyology
(c) Saurology (d) Herpetology

VMMC-2009

Ans. (b) :

• Study of fishes and fish research is a branch of zoology and is known as ichthyology.

• Arthrology, is the science concerned with the study of the anatomy, function, dysfunction and treatment of joints and articulation.

Saurology- study of lizards.

Herpetology- Study of Reptiles and Amphibians.

862. Which of the following is a catadromous fish?

(a) Hilsa sp. (b) Mystus sp.
(c) Anguilla sp. (d) Channa sp.

WB JEE-2010

Ans. (c) : Eels are catadromous fish, meaning they live in freshwater for most of their lives but migrate to the ocean to breed. The genus Anguilla includes all eels species. So Anguilla species is a catadromous fish.

• Catadromous fishes live mostly in freshwater the freshwater fishes which migrates to sea water for breeding are called catadromous.

863. One of the following animal belongs to Cyclostomata

(a) Channa (b) Loris
(c) Dodo (d) Petromyzon

J&K CET-2008

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Ans. (d) : One of the animal belongs to Cyclostomata is Petromyzon. Petromyzon is a parasitic lamprey. It has rounded sucker like a moth. They have the eel-like body. The sharp retractable teeth are arranged in circular fashion.

864. Torpedo is commonly known as :
(a) Suckerfish (b) Electric ray
(c) Globefish (d) Sea horse
HP CET-2011

Ans. (b) : Torpedo is commonly known as electric ray as they possess an electric organ a modified muscle tissue. It produce an electric discharge from 8-100 volts form communication, defense and navigation.
Torpedo has a disc-shaped body that is light to dark brown in color on the dorsal surface.

865. Which of the following is characteristic of fishes?
(a) Tail and venous heart
(b) Venous heart and gills
(c) Gills and tail
(d) Scales and gills
Manipal-2000

Ans. (b) : The characteristic features of fishes is Venous heart and gills.
• Heart 2- chambered (1 atrium, 1 ventricle) and venous or single circuit, sinus venosus and renal and portal systems present.
• Erythrocytes nucleated Poikilothermus.
• Locomotion by paired pectoral an pelvic fins along with median dorsal and caudal fins.

866. Select an anadromous fish:
(a) Hippocampus (b) Petromyzon
(c) Exocoetus (d) Anabas
Haryana PMT-2002

Ans. (b) : An anadromous fish is Petromyzon.
■ In anadromous the fish originated in the freshwater and live seawater but again migrates to freshwater. To spawn example Salmon, petromyzon and smelt.

867. The larva of Petromyzon is known as
(a) Redia (b) Spat
(c) Ammocoete (d) Tornaria
AMU-1997

Ans. (c) : The larva of Petromyzon is known as ammocoete.
• Spat is larval stage of oysters which is tiny and freely navigate the water.
• Tornaria larva is found in Hemichordates.

P. Chondrichthyes

868. The larvicidial fish used in biocontrol of mosquitoes :
(a) Gambusia (b) Hilsa
(c) Scalophagus (d) Gold fish
Tripura JEE-2018 / MGIMS Wardha-2014
Uttarakhand PMT-2007 / Punjab MET-2003

Ans. (a) : Gambusia is fish which used in control of mosquitoes by biological method
• Gambusia is also known as western mosquito fish and diet generally larvious of mosquitoes and other aquatic insect.
• Hilsa fish very popular and sold for food fish.
• The Gold fish is freshwater fish in the family Cyprinidae of order Cyprininformes.
• It commonly kept as a pet in indoor aquarium fish.

869. Placoid scales is the characteristic feature of class
(a) Cyclostomata (b) Chondrichthyes
(c) Osteichthyes (d) Amphibia
JIPMER-2013/ VMMC-2011
J&K CET-2011 / JIPMER-2011

Ans. (b) :• Placoid scales is the characteristic feature of condrichthyes (cartilaginous fishes) e.g. shark and ray.
• Placoid scales are after referred to as denticles.

870. The excretory material of bony Fish is
(a) Urea (b) Protein
(c) Ammonia (d) Amino acid
BCECE-2014 / Kerala PMT-2015
BVP-2007 / Rajasthan PMT-2008

Ans. (c) : The excretory material of bony fishes is ammonia. Ammonia is the excretory waste in fishes. It is easily soluble.

871. Jaw less fish like vertebrates are.
(a) Tunicates (b) Osteichthys
(c) Cyclostomes (d) Apods
TS EAMCET-11.05.2023, Shift-II

Ans. (c) : Jawless fish belong to the group Agnatha or cyclostomes this group includes two main classes : mxxini (hangfishes) and petromyzontida (Lampreys) Jawless fish are characterized by their lack of two Jaws and paired fins and they are considered of most primitive vertebrates like cyclostomes.
Cyclostomes are considered living fossils because their character are rarely vertebrates ancestors.

872. Study the following and pick up the correct combinatins.

S.N.	Scientific name	Common name	Character
I	Hippocampus	Sea horse	Female has a brood pouch
II	Trygon	Sting ray	Possesses poison sting
III	Torpedo	Electric ray	Ventral muscles modified into electric organs
IV	Exocoetus	Flying fish	Contains air bladder

Options:
(a) I, II (b) II, IV
(c) I, III (d) III, IV
TS EAMCET-31.07.2022 Shift-I

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Ans. (b) :

	Scientific Name	Common Name	Character
II	Trygon	Sting Ray	Possesses Poison Sting
IV	Exocoetus	Flying Fish	Contains air Bladder

873. Study the following table and pick up the correct combinations.

S. No	Group	Salient feature	Example
(I)	**Cyclostomata**	**Tongue with horny teeth**	**Myxine**
(II)	**Pisces**	**Dicondylic skull**	**Petromy-zon**
(III)	**Chondrichthyes**	**Claspers in male**	**Scoliodon**
(IV)	**Osteichthyes**	**Presence of operculum**	**Torpedo**

Options:

(a) I, III (b) II, IV

(c) I, II (d) III, IV

TS EAMCET-30.07.2022 Shift-I

Ans. (a) :

	Group	Salient Feature	Example
I	Cyclostomata	Tongue with horry teeth	Myxine
III	Chondrichthyes	Claspers in male	Torpedo, Scoliodon (Dog fish)

874. Study the following table and pick up the correct combination (s).

S.No	Group	Salient feature	Example
I	**Cyclostomata**	**Circular mouth**	**Lamprey**
II	**Pisces**	**Poikilotherms**	**Hag fish**
III	**Chondrichthyes**	**Lamelliform gills**	**Pristis**
IV	**Osteichthyes**	**Placoid scales**	**Labeo**

(a) I, II (b) II, IV

(c) I, III (d) III, IV

TS EAMCET-31.07.2022 Shift-II

Ans. (c) :

	Group	Salient feature	Example
I	Cyclostomata	Circular mouth	Lamprey
III	Chondrichthyes	Lamelliform gills	Pristis

875. Heart in fishes is described as

(a) Nurogenic and bronchial heart

(b) Myogenic, bronchial and venous heart

(c) Neurogenic and venous heart

(d) Neurogenic and alternate heart

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : A fishes heart is called a venous heart because the heart receives blood from veins and sends it to the gills for oxygenation the heart is two-chambered and performs single circulation where it receives and pumps only deoxygenated blood.
The heart in fishes is described as myogenic, bronchial and venous heart.

876. Assertion (A) : Cartilaginous fishes are viviparous
Reason (R) : Males of cartilaginous fishes have claspers to facilitate internal fertilization

(a) Both A and R are correct and R is the correct explanation of A

(b) Both A and R are correct but R is not the correct explanation of A

(c) A is true but R is wrong

(d) A is wrong but R is true

AP EAPCET-12.07.2022 Shift-I

Ans. (a) :
(A) Cartilaginous fishes are viviparous.
(B) Males of cartiliaginous fishes have claspers to facilitate internal fertilization.

877. Which of the following organ found in bony fishes keeps them floating in water without much expenditure of energy?

(a) Gills

(b) Air bladder

(c) Bursa fabrisci

(d) Diphycercal caudal fin

AP EAMCET-12.07.2022 Shift-II

Ans. (b) : Air bladder found in bony fishes is a hydrostatic organ which regulate buoyancy.

878. Which of the following is exclusively marine and considered as scavenger (feeds on dead or dying fish)?

(a) Hag fish (b) Lamprey

(c) Lung fishes (d) Latemaria

AP EAMCET-11.07.2022 Shift-I

Ans. (a) : Hagfish are eel-like fish that are found in all oceans except the Arctic and Antarctic. They are exclusively marine and are considered as scavengers. They feed on dead or decaying fish by rasping their teeth on the fish's flesh. Hagfish are also known for their ability to produce a large amount of slime when threat end.

879. Assertion (A): Heart of fishes is called branchial heart
Reason (R): It receives deoxygenated blood from body parts
The correct option among the following is

(a) (A) is true, (R) is true but (R) is the correct explanation for (A)

(b) (A) is true, (R) is true but (R) is the correct explanation for (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

Ans. (b) : In fishes the heart is divided into two chambered which consists of an auricle and a ventricle. The heart of fish contains and pumps only deoxygenated blood hence the blood does not return to the heart. The blood oxygenate by the gills and does not return back to the heart.

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880. In fishes, ____ maximizes oxygen transfer from water into the gills.

(a) more permeability for solutes
(b) more thin membranes of gills
(c) more number of gills
(d) counter-current flow

MHT CET-08.10.2020 Shift-I

Ans. (d) : Fish use gills for gas exchange.
Counter-current flow – As the blood flows in the opposite to the water, it always flows next to water that has given up less of its oxygen.
This way the blood is absorbing more and more oxygen as it moves along.
The counter current exchange system found in fish gill maximizes gas exchange efficiency by decreasing the oxygen content of the blood leaving the gill filament.

881. Match the following columns and select the correct option.

Column-I		Column-II	
(A)	**6-15 pairs of gill slits**	**(i)**	**Trygon**
(B)	**Heterocercal caudal fin**	**(ii)**	**Cyclostomes**
(C)	**Air Bladder**	**(iii)**	**Chondrichthyes**
(D)	**Poison sting**	**(iv)**	**Osteichthyes**

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iii)	(iv)	(i)	(ii)
(b)	(iv)	(ii)	(iii)	(i)
(c)	(i)	(iv)	(iii)	(ii)
(d)	(ii)	(iii)	(iv)	(i)

NEET-2020 Phase-I

Ans. (d) :

(A)	6-15 pairs of gill slits:	(ii)	Cyclostomes
(B)	Heterocercal caudal fin:	(iii)	Chondrichthyes.
(C)	Air bladder:	(iv)	Osteichthyes
(D)	Poison sting:	(i)	Trygon

882. Identify the correct differences between Chondrichthyes and Osterichthyes

(a) Chondrichthyes have gill slits covered operculum and Osteichthyes have gill slits without operculum
(b) Chondrichthyes have swim bladder and Osteichthyes do not have swim bladder
(c) Chondrichthyes contain placoid scales and Osteichthyes contain cycloid scales
(d) Chondrichthyes contain terminal mouth and Osteichthyes contain ventral mouth

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : Chondrichthyes contais placoid scale, gill slits are separate and without operculum. Due to absensce of air bladder they have to swim constantly where as osteichthyes contain cycloid/ctenoid scales, they have four pairs of gills which is covered by operculum on each side. Air bladders are present which regulate buoyancy.

883. Study the following and choose The correct combinations.

	Group	**Example**	**Character**
A	**Chondrichthyes**	**Torpedo**	**Dorsal muscle modified into electric organ**
B	**Rhynchocephalia**	**Sphenodon**	**Copulatory organ is hemipenis**
C	**Urodela**	**Salamandra**	**Amphicoelous vertebrae**
D	**Chelonia**	**Testudo**	**Edentate**

Options:

(a) A, C (b) B, C
(c) A. D (d) C, D

AP EAMCET-24.04.2019 Shift-II

Ans. (c) :

	Group	**Example**	**Character**
(A)	Chondrichthyes	Torpedo	Dorsal mscle modified into electric organ
(B)	Rhynchocephalia	Sphenodon	Copulatory organ is hemipenis
(D)	Chelonia	Testudo	Edentate

884. Study the following characters :

A. Aquatic (marine and fresh water) forms
B. Body scaleless
C. Cartilaginous endoskeleton
D. Renal portal system absent

The above characters are found in

(a) Chondrichthyes (b) Hemichordata
(c) Cyclostomata (d) Cephalochordata

TS EAMCET-08.05.2019 Shift-I

Ans. (c) : Cyclostomata are–
(a) Aquatic (marine and fresh water) forms
(b) Body scaleless
(c) Cartilaginous endoskeleton
(d) Renal portal system absent

885. Which one of the following characters is not correct with respect to Ratitae

(a) Flightless birds
(b) Sternum without keel
(c) Syrinx. clavicles are present
(d) males have penis

TS EAMCET-03.05.2018 Shift-I

Ans. (c) : Syrinx and clavicles are not found in Ratitae.
• The characters of Ratitae are flightless sternum without keel, male have penis.

886. Match the following

	List-I		**List-II**
(A)	**Ostracodermi**	**(I)**	**Lobe-finned fishes**
(B)	**Coelocanth**	**(II)**	**Exocoetus**
(C)	**Cyclostomes**	**(III)**	**Extinct jawless fishes**
(D)	**Osteichthyes**	**(IV)**	**Hagfish**

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The correct match is

	A	B	C	D
(a)	(III)	(I)	(IV)	(II)
(b)	(II)	(III)	(I)	(IV)
(c)	(I)	(III)	(II)	(IV)
(d)	(III)	(II)	(IV)	(I)

TS EAMCET-2015

Ans. (a) :

	List-I	List-II
(A)	Ostracodermi	(III) Extinct Jawless fishes
(B)	Coelocanth	(I) Lobe-finned fishes
(C)	Cyclostomes	(IV) Hagfish
(D)	Osteichthyes	(II) Exocoetus

887. Weberian ossicles are found in:
(a) frog (b) snakes
(c) fishes (d) birds

AIIMS-1999

Ans. (c) : Weberian ossicles is a set of a chain of small bones that connect the auditory system to the swim bladder of fishes.

888. In class -Chondrichthyes
(1) notochord is persistent through life
(2) gill slits are separate and without operculum
(3) skin is tough, containing minute placoid scales
(4) tympanum represents ear
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2010

Ans. (a) : The notochord is a flexible rod that supports the body of the embryo. In Chondrichthyes, the notochord persists throughout life.
The gill slits are separate and do not have an operculum. The operculum is a flap of tissue that covers the gills in bony fish.
The skin is tough and contains minute placoid scales. Placoid scales are tooth-like scales that are embedded in the skin.
Tympanum is absent. Tympanum is a membrane that helps to transmit sound waves to the inner ear. Chondrichtyes do not have a tympanum.

889. A marine cartilaginous fish that can produce electric current is.
(a) Pristis (b) Torpedo
(c) Trygon (d) Scoliodon

AIPMT-2014
AP EAMCET-1998
BVP-2008

Ans. (b) : Torpedo (Electric Ray) is a cartilaginous fish that produces an electric current of around 8-220 volts.
- Scoliodon belongs to the group of a cartilaginous fish.
- Trygon is a cartilaginous fish that lacks an electric organ. They instead have a tail spine consisting of venom. Trygon is also called sting ray.
- Pristis is a cartilaginous fish but it is unable to produce an electric current. It is known as saw fish.

890. Fish which can be used in biological control of mosquitoes/larvicidal fish is
(a) Eel (b) carp
(c) cat fish (d) Gambusia

AIPMT-1989

Ans. (d) : Gambusia is a larvicidal fish. And it is biologically control population of mosquitoes.

891. Which is a true fish?
(a) Cat fish (b) Silver fish
(c) Cuttle fish (d) None of these

JIPMER-1996

Ans. (a) : Cat fish is true fish having prominent barbels without scales.
- Jellyfish belong to phylum coelenterate. Jellyfish is a free-swimming marine animal that has an umbrella shaped body.
- Silverfish (Lepisma) is arthropods. It is a wingless insect.

892. Which of the following is not a lung fish?
(a) Neocerotodus (b) Acipenser
(c) Lepidosiren (d) Protopterus
(e) None of the above

CMC Vellore-2015

Ans. (b) :
– Protopterus is an African lungfish
– Neocerotodus is an Australian lungfish
– Lepidosiren is South American lungfish
– Acipenser commonly known as sturgeon it is not a lung fish.

893. Which one is not a carp?
(a) Labeo rohita (b) Catla catla
(c) Mystus (d) Cyprinus

Punjab MET-2011

Ans. (c) : Mystus is not a carp. Mystus is a genus of fish in the family Bagridae native to Asia. Phylogenetic relationship within this genus are poorly understood, though, it has been suggested that there are two major lineage.

894. Jaws present in which of the following?
(a) Heradmania (b) Fishes
(c) Petromyzon (d) Amphoxus

Rajasthan PMT-1999
MGIMS Wardha-2012

Ans. (b) : Heradmania belong to urochordata.
- Amphioxus is a cephalochordate.
- Fishes belong to Gnathostomata and bear jaw.

895. The character not related to chondrichthyes is
(a) Claspers
(b) Placoid scales
(c) Filamentous gills
(d) Heterocercal caudal fin

AP EAMCET-2015

Ans. (c) : The character not related to chondrichthyes is Filamentous gills.
Claspers-Claspers are located on the inner edge of the anal fins near the male's cloaca.

896. Statement (S): Fishes belonging to "Chondrichthyes" have heterocercal caudal fin.
Reason (R) : These fishes have an air bladder that acts as a hydrostatic organ.

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(a) Both (S) and (R) are correct and (R) is the correct explanation to (S)
(b) Both (S) and (R) are correct but (R) is not the correct explanation to (S)
(c) (S) is correct but (R) is wrong
(d) (S) is wrong but (R) is correct

TS EAMCET-15.05.2016

Ans. (c) : (S) Fishes belonging to chondrichthyes have heterocercal caudal fin.
(R) Air bladder or swim bladder is buoyancy found most of the bony fishes. It contains gas (O_2) and function as a hydrostatic organ.

897. In which endoskeleton is made up of cartilage?
(a) Dipnoi (b) Mollusca
(c) Elasmobranchii (d) Bony fishes

Rajasthan PMT-1995

Ans. (c) : Elasmobranchii has well-developed endoskeleton made up to cartilage.
• Dipnoi is primitive lung fishes in which the swim bladder present (bony cartilage endoskeleton).

898. Which one of the following is a fish?
(a) Sea peri (b) Sea horse
(c) Sea lion (d) Sea urchin

CG PMT-2009
BVP-2011

Ans. (b) :
• Sea horse (Hippocampus) is a fish belonging to class osteichthyes under phylum chordate.
• Sea urchin (echinus) is a spiny animals under phylum Echinodermata.

899. Scales are absent in
(a) Catia (b) Wallago
(c) Cirrhinus (d) Scoliodon

CMC Vellore-2011

Ans. (b) : Scales are absent in wallago attu and body is covered with naked skin.
• In catla cycloid scales are present.
• Scoliodon have placoid scales on their skin.

900. Which of the following is characteristics of fishes?
(a) tail and venous heart
(b) venous heart and gills
(c) gills and tail
(d) scales and gills

Punjab MET-2004

Ans. (b) : Fish have a single loop circulatory system to take blood from the heart to gill and then the body. Heart of fish is known as venous heart gill of fish used for oxygen intake.

901. Choose the wrong statement
(a) Teeth in Chondrichthyes are modified ctenoid scales
(b) Air bladder in fishes regulates buoyancy
(c) In amphibians, the tympanum represents the ear
(d) Long bones in birds are pneumatic
(e) Reptiles are poikilotherms

Kerala PMT-2014

Ans. (a) The mouth of the members of class chondrichthyes is located ventrally and the teeth are modified placoid scales.

902. Identify the edible freshwater teleosts
(a) sharks (b) rays and skates
(c) Hilsa hilsa (d) Catla catla

Uttarakhand PMT-2007

Ans. (d) : Catla catla is an edible fresh water teleost any bony fish of the subclass teleostei having rayed fins and a swim bladder the group contains most of the bony fish include the hernings, carps, cod, perches etc.

903. Which of the following is not a true fish?
(a) Dog fish (b) Devil fish
(c) Catfish (d) Sawfish

Uttarakhand PMT-2007

Ans. (b) : The fish are characterized by the presence of the scales on their skins. Devil fish also known as octopus and belonging to phylum mollusca.

904. Flying fish is
(a) Torpedo (b) Scoliodon
(c) Anguilla (d) Exocoetus

BVP-2012
MGIMS Wardha-2007

Ans. (d) : Flying fish is also known as the Exocoetus. It belong to the family of Exocoetidae of class Actinopterygii. their body is stream-lined.

905. Which is not a fish?
(a) Scoliodon (b) Electric ray
(c) Whale (d) Sea horse

HP CET-2013

Ans. (c) : The whale is not a fish but it is mammal because whale is warm blooded but fishes are cold blooded.
• Scoliodon is fishes have exoskeleton of placoid scales.
• Electric ray are a group of ray flattered cartilaginous fish with enlarged pectoral fins.
• Seahorse is small marine fish in the genus Hippocampus

906. Which of the following substance is at its lowest level in fish food?
(a) Actin (b) Myosin
(c) Cholesterol (d) Tissue fluid

Uttarakhand-2005

Ans. (c) : The substance is at its lowest level in fish food is Cholesterol. Fish meal is highly nutritive because it contains easily digestible proteins (55-70%), Minerals (10-20%) and water (6-12%).
The maximum cholestrol found eggs, some shellfis, liver, liver pats and offal.

907. Electric organs are found in
(a) sharks (b) porpoises
(c) goldfish (d) rays

CG PMT-2006

Ans. (d) : Electric organs are masses of Flattened cells called electrocytes, which are stacked in regular rows along the side of certain fishes.
• electric organ found in Torpedo, Raja (stingray), Malapterurus.
• In Raja (Sting ray) shape of electric organ is spindle shape and located parallel to the spinal cord in the tail.
• Shark are group of elasmobranch fish characterized by a cartilaginous skeleton.
• Porpoises a aquatic marines mammals and similar appearance to dolphins.

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908. Ichthyology is study of
(a) aves (b) amphibians
(c) reptiles (d) fishes
JIPMER-2013

Ans. (d) : Ichthyology is study of fish including bony fish, Osteichthyes, cortilaginous fish, Condricnthyes and jawless fish (Agnatha)
- Ornithology, a branch of zoology dealing with the study of birds.
- Herpetology, a branch of zoology that deals with the study of amphibians and reptile.

909. Presence of claspers is an important character in:
(a) Sphyrna (b) Hippocampus
(c) Cyanoglossus (d) Echenis
AP EAMCET-1999

Ans. (a) : The presence of claspers is an important character in "Sphyrna".
They show sexual dimorphism the male bear pair of hard elongated claspers attached to the pelvic fin.
Claspers help in copulation.

910. These organisms have chloride cells
(a) Plants (b) Freshwater fish
(c) Protozoa (d) Birds
BCECE-2009

Ans. (b) : The chloride cell is characteristic feature of marine fish which help to elimination of excess of salts from body fluid is necessary for osmo-regulation.

911. The brood pouch in sea horse is found at the belly of
(a) male (b) female
(c) absent (d) Both (a) and (b)
AMU-2002

Ans. (a) : Seahorse possess the unique characteristic of male pregnancy e.g male not females incubate embryos in a specialized structure called a "brood pouch".
The brood pouch is formed along the ventral midline of the tail.
The lumen of the brood pouch is surrounded by loose connective tissue called pseudoplacenta and dermis.

912. Which one of the following animal contains idiophores in its integument ?
(a) Dog fish (b) Parrot
(c) Siren (d) Orangeutan
Rajasthan PMT-2000

Ans. (a) : Dogfish : Spiny dog fish are slim, with a narrow pointed snout and characteristic white spots. They are gray above and white below. They have two dorsal fins with ungrooved large spines.
Classification

Phylum	-	chordata
Class	-	chondrichthyes
order	-	squalifarmes
family	-	squalidae

913. Which of the following represents the correct combination without any exception?

	Characteristics	Class
(a)	**Mouth ventral, gills without operculum; skin with placoid scales; persistent notochord**	**Chondrichthyes**
(b)	**Sucking and circular mouth;jaws absent, integument without scales; paired appendages**	**Cyclostomata**
(c)	**Body covered with feathers; skin moist and glandular fore-limbs form wings; lungs with air sacs**	**Aves**
(d)	**Mammary gland; hair on body; pinnae; two pairs of Limbs**	**Mammalia**

AIPMT-2015

Ans. (a) : Chondrichthyes are marine animals with streamlined body and have cartilaginous endoskeleton. Mouth is located ventrally. Notochord is persistent throughout life. Gills slits are separate and without operculum. The skin is tough, containing minute placoid scales. Teeth are modified placoid scales which are backwardly directed. Their Jaw are very powerful.

914. Which one of the following categories of animals, is correctly described with no single exception in it
(a) All sponges the marine and have collared cells
(b) All mammals are viviparous and posses diaphragm for breathing
(c) All reptiles posses scales, have a three chambered heart and are cold blooded (poikilothermal)
(d) All bony fishes have four pairs of gills and an operculum on each side
AIPMT (Mains)-2012

Ans. (d) : In bony fishes four pairs of gills and each is covered over by operculum on present either side.
- Prototherian mammals are oviparous.
- Sponges are aquatic mostly marine some freshwater and have choanocytes or collar cells are characterstics of porifera.
- Heart is generally 3-chambered in reptiles but in crocodile it is 4 chambered.
- All mammals are viviparous with exception ornithorhynches- (Platypus) which is oviparous (egg laying)

915. Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them?
(a) Ascaris and Ancylostoma - Metameric segmentation
(b) Sea horse and Flying fish - Cold blooded (poikilothermal)
(c) Pteropus and Ornithorhyncus – Viviparity
(d) Garden lizard and Crocodile - Three chambered heart
AIPMT (Mains)-2012

Ans. (b) : Sea horse and flying fish, belong to class-Pisces and cold blooded animals (Poikilothermic). i.e the temperature of their body varies with the environment.
- Ornithorhynchus is oviparous.
- Garden lizard has a 3-chambered heart while crocodile has a 4-chambered heart.
- Ascaris and Ancylostoma do not show metameric segmentation

@apna_pdf

916. Which one of the following pairs of animals comprises 'Jawless fishes' ?
(a) Guppies and hag fishes
(b) Lamprey and eels
(c) Mackeral and Rohu
(d) Lampreys and hag fishes

AIPMT-2009

Ans. (d) : Lampreys and hag fishes are "Jaw less" fishes. The marine, elongated and freshwater fishes lacking a jaw and paired appendages sometimes considered to belong to the taxon Agnatha. Both lampreys and hag fishes are present in living form.
The lampreys are parasitic fishes. They rasp away flesh and suck out blood from the host fishes. The hag fishes feed upon marine worms and other aquatic invertbrate animals.

917. Sharks and dogfishes differ from skates and rays by
(a) Their pectoral fins distinctly marked off from cyclindrical bodies
(b) Gill slits are ventrally placed
(c) Head and trunk are widened considerably
(d) Distinct demarcation between body and tail

NEET (Karnataka)-2013

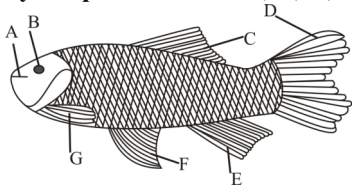
Ans. (a) : Sharks and dogfishes differ from skates and rays by their pectoral fins distinctly marked off from cylindrical bodies.

918. Study the following features of a fish
(A) It is a crossopterygian fish.
(B) It is found in the river Chalumnae.
(C) It does not exhibit aestivation.
(D) It is an urecotelic animal.
Which of the above are true to "Neoceratodus"
(a) A and B (b) B and D
(c) A and C (d) A and D

AP EAMCET-2008

Ans. (c) : Neoceratodus belonging to the genus of lungfish which isthe family of Neoceratodontidae. Neoceratodus jorsteri is the only species and is considered as living fossil.

919. The diagram of Labeo rohita is given below. Identify the parts labelled A, B, C, D, E, F, G.



(a) A = Nostril, B = eye, C = Anal fin, D = Caudal fin. E = Dorsal fin, F = Pectoral Fin, G = Pelvic fin.
(b) A = Nostril, B = eye, C =Dorsal fin, D = Anal fine, E = Caudal fin. F= Pectoral fin, G = Pelvic fin.
(c) A = Nostril, B = eye, C = Dorsal fin. D = Caudal fin E = Pectoral fin, F = Anal fin. G = Pelvic fin.
(d) A = Mouth, B = eye, C = Dorsal fin. D = Caudal fin E =Anal fin, F = Pelvic fin, G = Peectoral fin.

Karnataka CET-2010

Ans. (d) : In the given figure of Labeo rohita.
A–Mouth, B–Eye, C–Dorsal fin
D–Caudal fin, E–Anal fin
F–Pelvic fin, G–Pectoral fin.

920. Which of the following is found exclusively in the sea water?
(a) Prawns (b) Trygon
(c) Crabs (d) Oysters

Karnataka CET-2008

Ans. (b) : Trygon found exclusively in the sea water. It is also called as sting ray is a cartilaginous fish which found exclusively in marine water. It typically inhabits sandy or muddy shallow, coastal waters and is life threatening due to its venomous tail spine.
Prawns, Crabs and Oysters can be found in both fresh and salt water also.

Q. Osteichthyes

921. Match the following related to caudal fins fishes

Types	Character	Example
A. Homocercal	**i. asymmetrical both externally and internally**	**p. Shark**
B. Diphycercal	**ii. vertebral column extends into the larger ventral lobe**	**q. Flying fish**
C. Heterocercal	**iii. symmetrical externally and asymmetrical internally**	**r. Catla**
D. Hypocercal	**iv. symmetrical both externally and internally**	**s. Latimeria**

(a) (A–iv–r), (B–iii–s), (C–ii–p), (D–i–q)
(b) (A–iii–r), (B–iv–s), (C–i–p), (D–ii–q)
(c) (A–iv–r), (B–iii–s), (C–i–p), (D–ii–q)
(d) (A–iv–s), (B–iii–r), (C–ii–p), (D–i–q)

AP EAPCET-07.09.2021 Shift-I

Ans. (b) :

	Type	Charater	Example
(A)	Homocercal	symmetrical externally and asymmetrical internally	r. Catla
(B)	Diphycercal	symmetrical both externally and internally	s. Latimeria
(C)	Heterocercal	asymmetrical both externally and internally	p. Shark
(D)	Hypocercal	vertebral column extends into the larger ventral lobe	q. Flying fish

922. Which of the following option is correct?

(a)	Osteichthyes	4 pair of gill slits covered by operculum gills
(b)	Chondrichthyes	6–15 pairs of slits
(c)	Arthropoda	Metamerism and excretion by nephridia
(d)	Platyhelminthes	Bilateral symmetry & coelomate e.g., Taenia and Fasciola

AIIMS-26.05.2018 Shift-II

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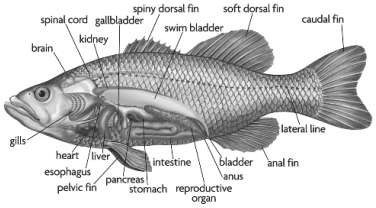
Ans. (a) : Osteichthyes- Osteichthyes is a class having bony fishes. These fishes have 4 pairs of gill slits covered by operculum gills.



923. Statement (S) : Marine lampreys migrate to rivers for spawning.
Reason (R) : Marine lampreys return to sea water after spawning
(a) Both (S) and (R) are correct but (R) is not the correct explanation to (S)
(b) Both (S) and (R) are correct but (R) is the correct explanation to (S)
(c) (S) is wrong but (R) is correct
(d) (S) is correct but (R) is wrong

TS EAMCET-2015

Ans. (d) : Marine lampreys migrates to rivers for spawning. Cyclostomes are marine but migrate to fresh water for spawning.
Spawning:- The process of release of eggs into water by aquatic animals is called spawning.

924. One of the world's most poisonous fish toxins is released by:
(a) clown fish (b) sword fish
(c) eel fish (d) puffer fish

AIIMS-2012

Ans. (d) : The species of puffer fish (family, Tetraodontidae) are the most poisonous in the world.
• **Puffer fish** releases a very potential toxin called **tetrodotoxin**, a variety of neurotoxin. That can cause serious illness and death. These are poisons to central nervous system which are deadlier than cyanide.
• **Clown fishes** are edible , people are strongly advised not to eat them because of the slimy material on their skin.
• **Sword fish** is very common cooking fish.
• **Eel fish** is source of omega-3 fatty acid. It also contains a large quantity of calcium, magnesium, potassium, selenium, manganese, zinc and iron.

925. This is also known as flying fish:
(a) Scoliodon (b) Exocoetus
(c) Pristis (d) Trygon

BCECE-2015

Ans. (b) : Exocoetus is a two wing flying fish the pectoral fins are large to produce a wing like structure which helps the fishes in gliding and floating in air.
• Scoliodon is known as the dog fish, the common name is sand tiger shark.
• Pristis is the sawfish.

926. This is not a freshwater fish:
(a) Pomfret (b) Kalbasu
(c) Rohu (d) Catla

BCECE-2015

Ans. (a) : Pomfret is a bony marine fish belonging to family barmidae.
While Kalbasu, Rohu and catla are freshwater carps.

927. The ancestors of modern day Frogs and Salamanders are
(a) Jawless fish (b) Coelocanth
(c) Icthyophis (d) Amphioxus

Karnataka CET-2015

Ans. (b) : The ancestors of modern day frogs and salamnders are coleocanth.
Coelocanth:- Coelocanths are an ancient group of lobe finned in the actinistia. Sarcopterygians, they are more closely related to lungfish and tetrapods than to ray-finned fish.

928. Which one of the following matching pairs is incorrect?
(a) Shellfish - Pisces
(b) Silver fish - Arthropoda
(c) Cuttle fish - Mollusca
(d) Star fish - Echinodermata

WB JEE-2015

Ans. (a) : (A) Shell fish is the aquatic invertebrate that have a hard outer shell. They are classified under the phylum mollusca.
(B) Silver fish is a small and wingless insect under phylum arthropoda.
(C) Cattle fish is a marine animal belongs to phylum molluscs.
(D) Star fish belong to echinoderms.

929. A fresh water fish:
(a) Scylla serrata (b) Paenaeus indicus
(c) Cyprinus carpio (d) Sardinella longiceps

AP EAMCET-2002

Ans. (c) : Cyprinus carpio freshwater fish belonging family Cyprinidae.
Cyprinidae is family of freshwater fish and commonly called carp of minnow family.
• **Scylla serrata** commonly called mud crab or mangrove crab found in Estuaries and marin water

930. The excretory material of bony fish is
(a) urea (b) protein
(c) ammonia (d) amino acid

BVP-2012

Ans. (c) : The excretory material of bony fish is ammonia. That is why bony fishes ammonotelic and excretory material of cartilaginous fish is urea.
• Uric acid the main nitrogenous excretory product of birds.

R. Amphibia

931. Ichthyophis belongs to____
(a) Reptelia (b) Annelida
(c) Mollusca (d) Amphibia

AP EAMCET-24.09.2020 Shift-II
Karnataka CET-2000 / DU MET-2006
Rajasthan PMT-2004

Ans. (d) : Ichthyophis is commonly refer as caecillians a genus of limbless amphibians.
They are a group of elongated, worm-like amphibians belong to the order Gymnophora. Their skin is smooth and have sensory scales.

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932. Foramen of Panizzae is found in the heart of
(a) rabbit (b) pigeon
(c) crocodile (d) frog
HP CET-2011 / BCECE-2006
VMMC-2005 / AMU-2004

Ans. (c) : In the heart of the crocodile foramen of panizzae is found in the heart of crocodile which connects the left and right aorta in the heart of all animals of order crocodilian.

933. The Indian salamander is
(a) Siren (b) Tyilotriton
(c) Amblystoma (d) Nectzirus
AMU-2005 / Manipal-2004
Uttarakhand PMT-2004 / AP EAMCET-1997

Ans. (b) : Indian salamander is called as Tylototriton and also called as knobhy.
- Siren is a neoteic salamander.
- Ambystoma tigrinum is a tiger salamander.
- Necturus is aquatic salamander also called waterdogs and mudpuppies.

934. Assertion (A) : Amphibians remained as imperfect group
Reason (R) : Although, Amphibians invaded land, they could not adapt completely to terrestrial life.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true and R is wrong
(d) A is wrong and R is true
AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Amphibiane remained as imperfect group because they live on both land and water.
Head is clearly distinct but neck and tail may be present or absent hence body is mainly consist of two part
(i) Hand
(ii) Trunk
Exo skeleton is absent and digits without claws the teeth are small and homodantous tongue is bifid toward the anterior end.
Alimentary cannel terminates into cloaca .
although, Amphibian invaded land, they could not adapt completely to terrestrial life because fertilization is external in presence to water.
The development is direct and the larva is generally fad pole larva.

935. Pore in the foetal heart of human beings is
(a) Foramen Manro (b) Foramen Ovale
(c) Foramen Magnum (d) Fossa Ovalis
TS EAMCET-11.05.2023, Shift-II

Ans. (b) : The foramen ovals is a small opening in the fetal heart that allows blood to bypass to lungs. During fetal development, the lunge are not yet fully functions, so oxygenated blood from the placenta can be rich directly from the right atrium to the left atrium through the foramen o vale. This helps supply oxygenated blood to the developing fetal.
When body birth and start breach than left atrium increases closing the foramen ovalure.

936. The dental formula of an 18 years old man
(a) 2123/2123 (b) 2122/2122
(c) 2102/2102 (d) 2023/2023
TS EAMCET-11.05.2023, Shift-I

Ans. (b) : The dental formula of an 18 year old man
$\frac{2122}{2122}$ 2, incisor 1, canine, 2 premolar , 2 molars
The dental formula of adult human is
$\frac{2123}{2123}$ 2, Incisor, 1, canine, 2, Premolar, 3, molars.
This show arrangements of incisor, canines, premolar and molare. on one side of upper and lower jaws.

937. Reservoir host for Trypanosoma gambiense.
(a) Monkey (b) Rabbit
(c) African antelope (d) Female culex mosquito
TS EAMCET-11.05.2023, Shift-I

Ans. (c) : The reservoir host for trypanosome gamblense is African antelope.
The African sleeping sickness or African trypanosmiasis is cause of T.gambiense, humans are the main reservoir because the harbor the parasite in their blood stream, allowing it to be transmitted to tsetse flies when they take a blood meal.

938. Which among the following is not an amphibian character
(a) First tetrapods
(b) Monocondylic skull
(c) Three chambered heart
(d) Ureotelic animals
TS EAMCET-11.05.2023, Shift-I

Ans. (b) : Dicondylic skull is characteristic feature of amphibians. It refers to skull with two occipital condyles, which are rounded knod-like structures that articulates with the first vertebra. Monocondylic skull is characteristic feature of replies and birds.

939. Assertion (A) : Monkey is the reservoir host of malarial parasite
Reason (R) : Malaria is transmitted by monkey bite
(a) both A and R are true and R is the correct explanation of A
(b) both A and R are true but R is not the correct explanations of A
(c) A is true and R is false
(d) A is wrong and R is true
AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Monkey is the reservoir host of malarial parasite because some malarial parasite like P.knowlesi is cause malaria in monkey, and it develop in to monkey body and transmitted by mosquito.
Mosquito (Anapheles hackeri) is the vector of P. Knowlesi.
Many life stage found in monkey such as sporozoits , cryptozoite, crytometazoites, schizotstage metacryptozoite, tropchoite, signet ring stage and micro and mega gameto cyte.

940. 'Dicondylic skull' is characteristic features of _____
(a) Reptilia and Aves
(b) Amphibia and Reptilia

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(c) Aves and Mammals
(d) Amphibia and Mammalia

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : The term "dicondylic skull" describes a particular distinctive feature present in many species of amphibians and mammals.

941. Assertion (A): The development of amphibians takes place in aquatic habitat although they are first vertebrates to come out of water on the land
Reason (R): Amphibians lay anamniotic eggs without a shell, which cannot survive in terrestrial habitat
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not the correct explanation of A
(c) A is correct but R is wrong
(d) A is wrong but R is correct

AP EAMCET-05.10.2021 Shift-I

Ans. (a) :
(A) The Development of amphibians takes place in aquatic habitat although they are first vertebrates to come out of water on the land.
(R) Amphibians lay anamniotic eggs without a shell, which cannot survive in terrestrial habitat.

942. The heart of an amphibian is usually
(a) two chambered
(b) four chambered
(c) three chambered
(d) three and half chambered

Tripura JEE-2021
KVPY SA-2012

Ans. (c) : The heart of an amphibian is usually three chambered with 2 auricles and 1 ventricle. The blood contains R.B.C and nucleate and contain haemoglobin. Blood vascular system contains hepatic and portal system.

943. Male has a brood pouch in _____
(a) Kangaroo (b) Hippocampus
(c) Penguin (d) Ostrich

AP EAMCET-06.09.2021 Shift-I

Ans. (b): Hippocampus (Seahores; Pisces:- Syngnathidae) Posses the unique characteristic of male pregnancy incubate embryos in a specialized structure called a **brood pouch** . The brood pouch is formed along the ventral midline of the tail.

944. Choose the correct option
(a) Amphibia–Frog, Salamander, Bufo, Ichthyophis
(b) Reptiles – Lizard, Turtle, Hyla, Ichthyophis
(c) Birds – Pigeon, Parrot, Balaenoptera, Flying fox
(d) Arthropods–Apis, Ancylostoma, Laccifer, Nereis

AIIMS-26.05.2019 Shift-I

Ans. (a) : Amphibians means 'the organisms which can lives on both land and water'. Frog, Salamander, Bufo, Ichthyophis all are amphibians.
- Hyla, Ichthyophis are amphibians so the option (b) is incorrect.
- Balaenoptera, Flying fox are mammals so the option (c) is incorrect.
- Ancylostoma is genus of nematodes and Nereis is a genus of polychaete belong to annelids so the option (d) is also incorrect.

945. 'Sternum' also known as 'breast bone' first appeared in which of the following animals
(a) Pisces (b) Amphibians
(c) Reptiles (d) Birds

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Sternum also called breastbone, that lies in the middle of the frontal part of the chest.
- It is first appeared in Amphibians.
- Sternum classified into three main parts i.e. manubrium, body and xiphoid (serve as a point for muscular attachment).

946. Which ONE of the following organisms respire through the skin?
(a) Blue whale (b) Salamander
(c) Platypus (d) Peacock

KVPY (SA)-2018

Ans. (b) : Salamander are belong to class amphibians that respire through their skin. Salamanders characterized by their lizard-like appearance, with slender bodies, blunt snouts, short limbs and presence of a tail in both larvae and adults.

947. Among vertebrates tympanum, sternum are first appeared in
(a) Pisces (b) Amphibians
(c) Reptiles (d) Aves

AP EAMCET-25.04.2018 Shift-I

Ans. (b) : Tympanus, sternum are first appeared in amphibians. A thin membrane that vibrates in response to sound waves is the eardrum, which is referred to as the tympanum.
Sternum is the flat bone located in the middle of the chest, commonly referred as the breastbone.
Amphibians lack true sternum instead amphibian have a more simplified ribcage structure.

948. Statement (S): The amphibian blood is composed of erythrocytes, leucocytes and thrombocytes. The thrombocytes help in haemostasis.
Reason (R): The haemostasis regulates the body temperature in poikilotherms.
Which of the following is true?
(a) Both (S) and (R) are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-I

Ans. (c) : (s) The amphibians blood is composed of erythrocytes leucocytes and thrombocytes. The thrombocytes help in haemostasis.
(r) Haemostasts is a process to prevent haemo-range by arresting and keeping the blood within the damaged vessels walls or coagulation.

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949. 'Organ of Jacobson' helps in

(a) Touch (b) Vision
(c) Smell (d) Hearing

JIPMER-2017

Ans. (c) : Organ of jacobson's help in smelling. The organ of jacobson's, also known as the vomeronasal organ, is a chemosensory organ that helps animlas to detect pheromones. Pheromones are chemical signals that are released by animals to communicate with each other. Pheromones present on the roof of the mouth and connected with nasal cavity by duct. The organ of jacobson's is found in many animals, including snakes, lizards and mammals.

950. The upper pigmented part of frog egg is concerned with :

(a) nourishment (b) camouflage
(c) respiration (d) colouration

BCECE-2002

Ans. (b) : The upper pigmented part of frog egg is concerned with camouflage.
The pigmented pattern of frogs and their lack of colour on the ventral surface allow frogs to escape from predators. Usually, the underside of the frog is lighter color than the top side for the reason that if the frog is hanging on top of the water and a predator is searching for a frog, the sun's glare makes the frog difficult to spot, thus acting as a camouflage.

951. Salamander is:

(a) Mollusca (b) Annelida
(c) Bird (d) Amphibian

J&K CET-2003, 2002

Ans. (d) : Salamanders are the extinct species of amphibians belonging to the order caudata.
It is also known as living fossils.
Salamander diversity is most abundant in the Northern Hemisphere and most species are found in the holarctic exozone.

952. Amphibians were dominant during

(a) Carboniferous (b) Silurian
(c) Ordovician (d) Cambrian
(e) Jurassic

Kerala PMT-2009

Ans. (a) : Amphibians were dominant during Carboniferous. Carboniferous period of palaeozoic era is known as the age of amphibians.
This period was characterized by a worm and humid climate, which was ideal for amphibians.

953. Proteus anguinus is an example for

(a) Photokinesis
(b) Circannular Rhythms
(c) Effect of light on Pigmentation
(d) Photoaxis

AP EAMCET-2014

Ans. (c) : Proteus anguinus is an example for effect of light on Pigmentation. Its skin lack pigments, giving its body white, posty appearance.
It also has a pink due to blood capillaries near the skin, and as it translucency shows the contours of the internal organs.

954. Which of the following are correct for axolotl larva?

(a) It shows neoteny and paedogenesis
(b) Absence of thyroxine affect metamorphosis
(c) It is the larva of Hemichordata

(a) (i), (ii), (iii) (b) (i) and (ii)
(c) (ii) and (iii) (d) (iii)

UP CPMT-2007

Ans. (b) :
(I) It show neoteny and paedogenesis.
(II) Absence of thyroxine affects metamorphosis.
(III) It is the larva of salamander.

955. Which is not a true amphibian animal?

(a) Salamander (b) Toad
(c) Tortoise (d) Frog

AIPMT-1988

Ans. (c) : A Tortoise is not a true amphibian animal. Tortoise is a reptile. A tortoise can live on both land and water. Tortoise lay their eggs on land & burried them.
They are vertebrates i.e., they have a backbone and they are covered in scales. Toad, Salamander and frog are true amphibian animals.

956. Fire bellied toad is

(a) Amphiuma (b) Bombina
(c) Necturus (d) Salamandra

AIPMT-1988

Ans. (b) : Fire- bellied toad is commanly known as Bombina. fire- bellied, small amphibian characterized by bright orange colour.
Marking on the underside of its grayish body and limbs.

957. Necturus is

(a) hell bender (b) congo eel
(c) mud puppy (d) blind worm

AIPMT-1988

Ans. (c) : The common name of Necturus is mud puppy. A genus of aquatic salamanders is called Necturus . It is also known as waterdrogs.

958. The following organs appeared for the first time in amphibians

(a) Syrinx, urinary bladder and cloaca
(b) Tympanum, sternum and lacrimal glands
(c) Harderian glands, sebaceous glands and lacrimal glands
(d) furcula, four chambered heart and palate

AP EAMCET-2016

Ans. (b) : Tympanus, sternum and lacrimal glands are appeared for the first time in amphibians : - Tympanum (tympanic membrane or eardrum) covers the middle ear.
Sternum connects to ribs and supports formation of a complete strong rib cage.
Lacrimal glands are paired exocrine glands these are located on the lacrimal fossa of orbit.

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959. Which of the following are exclusively marine?
(a) Porifera (b) Amphibians
(c) Echinodermates (d) Mollusca
JIPMER-1996

Ans. (c) : Echinodermata exclusively found in deep sea marine water. eg.- Echinus, Starfish.
- **Porifera–** Lives in freshwater except few are found in saltwater, eg.-Haliciona.
- **Mollusca–** Mostly found in freshwater, seashore, saltwater. eg.- Pila.
- **Amphibia–** Exclusively fresh water organism and can live on both wate and land.

960. Spiral valve is present in
(a) right auricle (b) sinus venosus
(c) truncus arteriosus (d) right ventricle
Punjab MET-2011

Ans. (c) : The truncus arteriosus in some amphibians, including lungless salamanders has a spiral valve. The truncus arteriosus is a muscular tube that extends from the heart and serves as an outflow tract. The spiral valve is a ridge with a spiral form that extends into the truncus arteriousus lumen. By creating turbulence, it helps to slow down and regulate blood flow.

961. Which type of kidneys are found in amphibians?
(a) Holonephric (b) Mesonephric
(c) Pronephric (d) Metanephric
JCECE-2003
Rajasthan PMT-2002

Ans. (b) : Mesonephric kidneys are found in amphibians.
The mesonephric kidney is a temporary excretory organ which functions during larval stage of amphibians life cycle. It helps in excrete waste material of developing embryo and larvae.

962. Limbless amphibians are called
(a) paddle worms (b) glow worms
(c) caecilian worms (d) pin worms
J&K CET-2009

Ans. (c) : Limbless amphibians are inclued sub-class Lissamphibia and order-Gymnophonia or Apoda.

963. Incomplete double circulation is seen in
(a) Fish (b) Amphibians
(c) Birds (d) Mammals
(e) Arthropods
Kerala PMT-2015

Ans. (b) :
- Incomplete double circulation is seen in Amphibian and Reptiles.
- The amphibian have 3-chambered heart with 2 auricles and 1 ventricle.
- Normally oxygenated blood gets circulated all over the body and deoxygenated blood is carried back to heart.
- However deoxygenated blood can also be stunted to body and oxygenated blood cab be shunted back to lungs.
- Bird and mammals are worm-blooded animal have 4-chamber heart that separate oxygenated and deoxygenated blood.

964. Dicondylic skull with 10 pairs of cranial nerves is present in :
(a) Pisces (b) Amphibia
(c) Reptilia (d) Mammalia
Rajasthan PMT-1998

Ans. (b) : Diconcylic skull with 10 pairs of cranial nerves is present in amphibia.
Dicondylic skulls are known as the skull which connected to the body with articulatory condyles. It is present in mammals and amphibian.

965. Limbless amphibians belong to the order
(a) anura (b) urodela
(c) gymnophiona (d) lissamphibia
VMMC-2014 / UP CPMT-2001

Ans. (c) : Order-Gymnophiona (Apoda) - 165 species of burrowing caecilian, elongated bodies, and limbless , dermal scales embedded in annular folds of skin eyes without eyelids.

966. Axolotl is name given to larva of
(a) Roundworm (b) Amphioxus
(c) Ambystoma (d) Silkworm
Haryana PMT-2011, 2004 / Manipal-2003

Ans. (c) : The best example is axolotl larva of Ambystoma the axolotl larva is well known for retaining external gills throughout life. The presence of external gills is a larval characteristic which is permanently retained by Axolotl.
- Round worm larva is know as Rhabdifiform.
- Amphioxus larva is know as lancelet
- Silk worm larva is know as caterpillar.

967. Neoteny is seen in amphibians belonging to order
(a) Urodela (b) Gymnophiona
(c) Anura (d) Apoda
BHU PMT (Screening)-2011

Ans. (a) : Neoteny can be defined as the failure or delay of the larva to metamorphose while becoming sexual mature and best examples is the axolotl larva of Ambystoma if tyroxine or deficiance of water the Neoteny are effected and change in adult.
Neoteny found in order urodela or caudate
- Partial neoteny found in tadpoles of Hyla arborea Rana esculena
- Partial neoteny found in Ambystoma.

968. An animal, which has both exoskeletal and endoskeletal structures is a
(a) freshwater mussel (b) tortoise
(c) frog (d) jelly fish
Manipal-2009 / Karnataka CET-2009

Ans. (b) : The exoskeleton of tortoise consist of carapace and plastron and endoskeleton consists of an axial skeleton. Thus tortoise possess both exoskeleton and endoskeleton.
Exoskeletone structure provides protection animal body by external injuries. while endoskeleton provied machanical and structural support to the body.
- Frog have only endoskeleton because vertebrate.
- Jelly fish. Slugs, Leeches and Jellyfish have exoskeleton.

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969. Epidermal scale is the characteristic feature of class - Reptilia, which of the following class is without epidermal scale?
(a) Fish (b) Aves
(c) Mammals (d) Amphibian

VMMC-2010

Ans. (a) : The epidermal scale absent in fish because chondrichthyes have placoid scales and osterichthyes have ctenoid scales both of which are mesodermally originated.

- Epidermal scales are scales that arise from the outermost embryonic layer know as epidermal.
- Reptiles have dry bodies that are covered by epidermal scales or scutes and they are mostly terrestrial.
- Bird or aves and mammals are the only vertebrates that are worm-blood.

970. The largest RBCs among vertebrates are found in
(a) amphibians (b) reptiles
(c) mammals (d) aves

CMC Ludhiana-2014

Ans. (a) : Largest R.B.C is found in Amphibia e.g salamender 66 micrometer.
But invertebrate amphibian which is a long cylindrical body with four vestigial legs and feet comprising three toes the largest blood corpuscle is present.

971. Salamander can regenerate
(a) tail (b) limbs
(c) external gills (d) All of these

AMU-2003

Ans. (d) : All salamander demonstrates the potential to regenerate complex structure like entire limbs, a tail muscular tissues, substantial parts of their central nervous system and heart.
Thus salamander have both their regenerative mechanisms have been discovered.

972. Which animal is roofed terrapin ?
(a) Trionys (b) Kachuga tectum
(c) Chrysemys (d) Chelone

Rajasthan PMT-2000

Ans. (b) : Roofed Terrapin:- The Indian roofed turtle (pangshura tecta) is a species of turtle in the family Geoemydidae. It can be distinguished by the distinct "roof" at the topmost part of the shell.

973. Which animal is Surinam toad ?
(a) Pipa (b) Bufo
(c) Bombimntor (d) Alyte

Rajasthan PMT-2000

Ans. (a) : The common surinam toad or star fingered toad is a purely aquatic species of frog in the family pipidas with a widespread distribution in south America.

- These toads do not have teeth or a tongue so they use their webbed like front feet to handle food and swallow their prey.

974. Consider the following four statements (A-D) related to the common Frog Rana tigrina and select the correct option stating which one are true(T) and which ones are false(F)
Statements
(A) On dry land it would die due to lack of O_2 if its mouth is forcibly kept closed for a few days
(B) It has four-chambered Heart
(C) On dry land it turns uricotelic from ureotelic
(D) Its life-history is carried out in pond water

	(A)	(B)	(C)	(D)
(a)	F	T	T	F
(b)	T	F	F	T
(c)	T	T	F	F
(d)	F	F	T	T

AIPMT (Mains)-2011

Ans. (b) : Rana tigrina (frog) releases the CO_2 and takes the oxygen. Frogs breath through their skin, mouth lining and lungs to obtain oxygen. In frogs three chambered heart present. It has one ventrical and two atria.

975. Ureters act as urinogenital ducts in
(a) frog males
(b) human males
(c) human females
(d) frog both males and females

AIPMT (Mains)-2011

Ans. (a) : Ureters act as urinogenital ducts in frog males. In frog each kidney is composed of several structure and functional unit called **uriniferous tubule** or **nephron**.

- The ureters acts as urinogenital duct which opens in to cloaca (cloaca is a type of chamber which is the main function to pass urine, sperms and other faecal matter outside the body).

976. Select the animal from the examples given below which exhibits neoteny in its larval stage
(a) Amphiuma (b) Typhlonectes
(c) Ambystoma (d) Necturus

AP EAMCET-2010

Ans. (c) : Neotenic amphibians such as the **axolotl (Ambystoma mexicanum)** are often unable to undergo metamorphosis under natural conditions. Neoteny is a condition in which larval characters exhibit in adult.
Amphiuma – Amphiuma are **eel-like salamanders** with vestigial legs, they lack eyelids and a tongue.
Typhlonectes – Typhlonectes is a genus of amphibians in the family Typhlonectidae. These fully aquatic caecilians are found in Amazon Basin.
Necturus – Necturus is a genus of aquatic salamander native to the Eastern United State and Canada, they are commonly known as **water dogs mudpuppies**.

977. Which type of cleavage is exhibited in eggs of amphibian like frog?
(a) Holoblastic and equal
(b) Meroblastic and discoidial
(c) Unequal holoblastic
(d) Meroblastic superficeal

UP CPMT-2014

Ans. (c) : Amphibians exhibited holoblastic unequal cleavage in eggs. In mesolecithal and telolecithal eggs, the cleavage form of blastomeres of unequal size.

978. The pair of amphibians found in Indian peninsula is
(a) Amphiuma
(b) Tylototriton and Ichthyophis

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(c) Hyla and Ambystoma
(d) Psittacus and Apteryx

AP EAMCET-2009

Ans. (b) : Tylototriton is a genus of newt known as **Crocodile newts**, out of which T. verrucosus (Himalayan Crocodile newt) found in Indian peninsula. Ichthyophis peninsula is a species of caecillian commonly found in southest Asia.

S. Reptilia

979. Regeneration of tail in lizards is an example of
(a) epimorphosis (b) morpholaxis
(c) hetero morphosis (d) parthenogenesis

CMC Ludhiana-2012 / Manipal-2000
Punjab MET-2004 / BVP-2000

Ans. (a) : Replacing of lost organ of the body by proliferation of new cells from surface cell of injured part is called epimorphosis.
In lizards the regeneration of tail is the example of epimorphosis.

980. Which is a reptile?
(a) Salamander (b) Newt
(c) Toad (d) Turtles

J&K CET-2012
Rajasthan PMT-2004
Karnataka CET-2002
AMU-2002

Ans. (d) : Turtles are an order of reptiles known as Testudines. The main character is shell which are made of keratin, the material of hair, horns and claws. Turtles are ectornerms or coldblooded, omnivores.
- Newt is a salamander in the sub family pleurodelinae.
- Toad is common name for some frogs and class-amphibians.
- Salamander are group of amphibians.

981. Which of the following snake in not poisonous?
(a) Naja-naja (b) Python
(c) Hydrophis (d) Bungarus

Rajasthan PMT-2011
UP CPMT-2001
AIIMS-2000
Rajasthan PMT-1995

Ans. (b) : Python is a genus of non-venomous belong to family pythonidae, Phython are large constrictor snake known for their impressive size and strength. Mostly found in African & Asian continents.
- Naja-naja commonly known as Indian cobra and Bungarus (krait) belongs to the family elapidae which are deadliest venomous snakes families found in South Asia & Indian subcontinent.
- Hydrophis is also belongs to family elapidae, commonly known as hydrophilids, which are highly adapted reptiles live in marine water found in Indian and pacific Oceans.

982. Number of cranial nerves in snakes that belong to class Reptilia
(a) 12 pairs (b) 10 pairs
(c) 8 pairs (d) 14 pairs

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : Cranial nerb in reptiles 10 pairs and its example snakes.
- Reptile bird and mammals have 12 pairs cranial nerb present.
- Vagus nerbe is the longest cranial nerb in the body contain both motor and sensory.
- Trochilior nerbe is [IV] cranial nerb. It is smallest cranial nerb.

983. Identify the group in which sinus venosous is present but conus arteriosus is absent.
(a) Amphibia (b) Reptilia
(c) Aves (d) Mammals

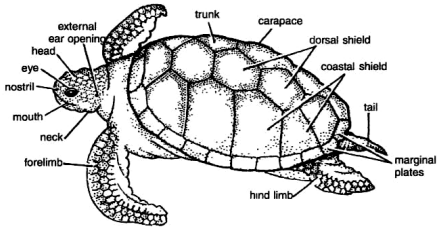
AP EAPCET-22.05.2023, Shift-I

Ans. (b) : Reptiles are characterized by a fully septation of the atrium, incomplete septation in the ventricle except in crocodylia and a ventricularization of conus.
The heart of amphibian contain two addition chamber called conus and arterious distribute blood to the body and sinus.

984. Which of the following animals has three chambered heart?
(a) Scoliodon (b) Hippocampus
(c) Chelone (d) Pteropus

NEET (Re-Exam)-04.09.2022

Ans. (c) : Reptiles except crocodiles have 3 chambered heart with 2 atria & partially divided single ventricle.



- Four chambered heart found in birds & mammals
- Two chambered heart present in fishes.

985. Which of the following is a living fossil in Reptiles?
(a) Archeopteryx (b) Limulus
(c) Sphenodon (d) Dinosaur

AP EAPCET-11.07.2022 Shift-I
DU MET-2003

Ans. (c) : Tuatara resembling most lizards are endemic to New Zealand.
Tuatara (Sphenodon) have been referred to as living fossils because they retain many basal characteristic from around the time of the mesozoic era.

986. Reptilian egg is described as
(a) Cleidoic, amniotic and megalecithal
(b) Microlecithal and amniotic
(c) Centrolecithal and amniotic
(d) Alecithal and amniotic

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : Reptilian eggs are described as cleidoic (haiving a cell), amniotic (with specialized fetal membranes) and megalecithal (containing a large yolk). This combination of features is characteristic of reptile eggs, helping then adapt to terrestrial environments.

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987. The Urinary bladder is absent in_____

(a) Wall lizard
(b) Snake and Crocodile
(c) Chameleon
(d) Snake

AP EAMCET-24.09.2020 Shift-II

Ans. (b) : Snake and crocodile is a uricotelic both produces uric acid as their primary nitrogenous waste product, which reduces the water loss compared to the excretion of liquid urine.

988. The vestiges of girdles are found in

(a) cobra (b) krait
(c) rattle snake (d) python

AP EAMCET-25.09.2020 Shift-II
AMU-2010

Ans. (d) : Vestigial pelvic girdle means the pelvic bone is present but they do not perform any function. It is found in python and boas. Snakes have prolonged bodies without any legs, inspite of the fact that the pythons have minimal rear appendages bones for support.
The pelvic girdle of python has no connection with their spine and it is simply float in muscle mass.

989. Match the following

	List -I		List –II
A.	**Vascular cloacal wall**	**I.**	**Squamata**
B.	**Thecodont dentition**	**II.**	**Chelonia**
C.	**Living fossil**	**III.**	**Crocodilia**
D.	**Jacobson's organ**	**IV.**	**Sphenodon**
		V.	**Cotylosauria**

The correct match is:

	A	B	C	D
(a)	II	III	I	V
(b)	II	III	IV	I
(c)	II	I	III	V
(d)	II	V	IV	III

TS EAMCET-28.09.2020 Shift-II

Ans. (b) :

Vascular cloacal wall	-	Chelonia
Thecodont dentition	-	Crocodilia
Living fossil	-	Sphenodon
Jacobsons organ	-	Squamata

990. Identify the following organism with Jacobson's organs, paired hemipenis and 12 pairs of cranial nerves

(a) Tropidonotus (b) Trionyx
(c) Chameleon (d) Bungarus

AP EAMCET-24.04.2019 Shift-I

Ans. (c) : Jacobson's organs, paired hemipenis and 12 pairs of cranial nerves are found in chameleon.
(1) Their colour change is not just a survival instinct.
(2) Chameleons tongues are their secret weapon.
(3) Chameleon cannot re-grow their tail.
(4) chameleon spit is incredible sticky.

991. Study the following table

	Group	Feature	Example
A	**Cyclosto -mata**	**Renal portal system is absent**	**Branchiostoma**
B	**Reptilia**	**Megalecithal and cleidoic eggs**	**Tropidonotus**
C	**Aves**	**Corpora quadrigemina**	**Psittacula**
D	**Amphi-bia**	**Collumella auris in middle ear**	**Rhacophorus**

Identify the correct combinations
Options :

(a) A, C (b) A, B
(c) C, D (d) B, D

AP EAMCET-24.04.2019 Shift-I

Ans. (c) :

	Group	Feature	Example
A	Cyclosto-mata	Renal portal system is absent	Jawless fishes
B	Reptilia	Megalecithal and cleidoic eggs	Turtle and tortoise
C	Aves	Corpora quadrigemina	Psittacula
D	Amphibia	Collumella auris in middle ear	Rhacophorus

992. Match the following ?

	Set-I		Set-II
A.	**Chelonia**	**I.**	**Sphenodon**
B.	**Rhynchocephalia**	**II.**	**Hemidactylus**
C.	**Crocodilia**	**III.**	**Testudo**
D.	**Squamata**	**IV.**	**Gavialis**

The correct match is

	A	B	C	D
(a)	IV	II	III	I
(b)	II	III	I	IV
(c)	III	I	IV	II
(d)	I	IV	II	III

TS EAMCET-08.05.2019 Shift-I

Ans. (c) :

Chelonia	-	Testudo
Rhynchocephalia	-	sphenodon
crocodilia	-	Gavialis
Squamata	-	Hemidactylus

993. Among the following animals, the best conserver of water is

(a) Frog (b) Turtle
(c) Cobra (d) Tiger

MHT CET-2019

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Ans. (c) : Cobra is the best conserver of water.
The king cobra-one of the most venomous snakes on the planet.
Can literally stand up and look a full-grown person in the eye.
It up to 18 feet long and toxic bite is powerful enough to kill an elephant.
It feed upon small mammals, lizards and birds.

994. Select the option with correct matching of animal group and its examples –
(a) Mammalian–Platypus, Rattus, Camelus Pavo
(b) Aves – Neophron, Struthio, Sphenodon, Passer
(c) Reptilia–Calotes, Heloderma, Uromastix, Draco
(d) Amphibia–Bufo, Hyla Rhacophorus, Ophiosaurus

AIIMS-27.05.2018 Shift-II

Ans. (c) : Calotes (green lizard), Heloderma (poisinous lizard), Uromastix (spiny-tailed lizard), Draco (flying lizard) all are lizards and belongs to class reptilia.
- Pavo is belong to class Aves so the option (a) is incorrect.
- Sphenodon is a living fossils belong to class reptilia so the option (b) is incorrect.
- Ophiosaurus is a reptile so the option (d) is also incorrect.

995. Select the correct option for Reptilia –
(a) 4 chambered heart - Chelone
(b) Tympanum represents ear - Crocodile
(c) External ear present – Ophiosaurus
(d) Dry and scaly skin – Salamndra

AIIMS-27.05.2018 Shift-I

Ans. (b) : The tympanum represents ear – Crocodile. The tympanum an external hearing structure.

996. Match the following

List-I	List-II
(p) Chelonia	**(i) Alligator**
(q) Rhynchocephalia	**(ii) Chameleon**
(r) Crocodilia	**(iii) Sphenodon**
(s) Squamata	**(iv) Testudo**

The correct answer is

	(p)	(q)	(r)	(s)
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iv)	(iii)	(i)	(ii)
(c)	(iii)	(ii)	(i)	(iv)
(d)	(iv)	(iii)	(ii)	(i)

TS EAMCET-02.05.2018 Shift-I

Ans. (b) :

	List – I	List – II
p	Chelonia	Testudo
q	Rhynchocephalia	Sphenodon
r	Crocodilia	Alligator
s	Squamata	Chameleon

Chelonia is the order of class reptilia. Turtles belong to the order of chelonia an example of testudo often known as the mediterranean tortoises, is a member of this group.
Rhynchocephalia– The species tuatara (sphenodon) is belong to order of Rhynchocephalia.
Crocodilia– They first found in the upper cretaceous period. They are ecotothermic animals which have four chamber heart. Ex.- Aligator.
Squamata– It is the larges order of raptiles, it comprised mostly lizards and snakes.

997. In reptiles, this region of vertebral column contains only two vertebral.
(a) Sacral (b) Cervical
(c) Lumbar (d) Caudal

AP EAMCET-28.04.2017 Shift-I

Ans. (a) : The number of sacral vertebrae varies from animal to animal.
- Amphibia have a single sacral vertebra.
- Reptiles have two sacral vertebra.
- Mammals have three or more sacral vertebra.

998. *Sphenodon punctatus* belongs to
(a) Reptilia (b) Amphibia
(c) Osteichtyes (d) Aves

Tripura JEE-2017

Ans. (a) : Sphenodon punctatus (Tuatara) belongs to reptilia and are endemic to New Zealand.
Sphenodon punctatus is the only living member of its order, which originated in the Triassic period around 250 million years ago and flourished during the Mesozoic era.
Sphenodon's body and tail are laterally compressed with a series of spines dorsally present along the middle line. Their limbs are pentadactyl, and its legs are short and primitive. The hind limbs of Sphenodon are usually plantigrade.

999. Which of the following statements are correct?
(i) Venom of cobra is neurotoxic
(ii) Venom of sea snake is neurotoxic
(iii) Venom of viper is haemotoxic
(a) (i) ,(ii) and (iii) (b) (i) and (iii)
(c) (i) and (ii) (d) (ii) and (iii)

UP CPMT-2007

Ans. (a) :
(I) Venom of cobra is neurotoxic
(II) Venom of sea snake is neurotoxic
(III) Venom of viper is haemotoxic

1000. Typhlops is
(a) sea snake (b) glass snake
(c) blind snake (d) grass snake

AIPMT-1988

Ans. (c) : A genus of blind snakes in the family typhlopidae found in Africa, Asia and Europe.

1001. Study the following and identify the correct match

Scientific name	Common name	Character
I. Draco	**Flying lizard**	**Cleidoic egg**
II. Bungarus	**Pond snake**	**Poisonous**
III. Ptyas	**Rat snake**	**Non-poisonous**
IV. Vipera russelli	**Chain viper**	**Non-poisonous**

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(a) II, III (b) III, IV
(c) I, III (d) I, IV

AP EAMCET-2016

Ans. (c) :

Scientific name	Common name	Character
Draco	Flying lizard	Cleidoic egg
Bungarus	Krait	Poisonous
Ptyas	Rat shake	non – poisonous
Viper resselli	Chain viper	poisonous

1002. Which of the following sets of derivatives of integumentary structures characterized birds as glorified reptiles?
(a) Syrinx and uropygial glands
(b) claws and uropygial glands
(c) Scales and claws
(d) Syrinx and scales

JIPMER-2002

Ans. (c) : The sets of derivatives of integumentary structures characterized birds as glorified reptiles is Scales and claws.
- Syrinx (sound box) is made up of expanded tympanum. the sound is produced by the vibration of the tympaniform membrane during expiration.
- Uropygial gland or oil gland or green glands are the only skin gland present. They are located at the root of the tail.

1003. The number of digits in the limb used for walking by reptiles are:
(a) 4 (b) 2
(c) 5 (d) 6

BCECE-2015

Ans. (c) : 5 digits (pentadactyle) links are used for locomotion by reptiles.

1004. Sinus venosus is present in :
(a) birds only
(b) birds and mammals
(c) reptiles and birds
(d) fishes, amphibians and reptiles

DUMET-2002

Ans. (d) : Sinus venosus is characteristic feature of fishes, amphibians and reptiles.
In the hearts of various invertebrates including fish, amphibians, and reptiles, is a tiny chamber called the sinus venosus. It functions as the body's first receiving chamber, taking in deoxygenated blood and bringing it back to the heart.

1005. Pick out the odd one :
(a) Annelida (b) Reptilia
(c) Insecta (d) Taenia

DUMET-2002

Ans. (b) :
(1) Reptiles are vertebrates they have backbones.
(2) Their bodies are completely covered with scales.
(3) They are cold-blooded.
(4) Reptiles produce shelled eggs or bear live young.
(5) All species fertilize eggs internally.
(6) All species of reptiles have at least one lung.

1006. Which of the following is connecting link between reptiles and birds?
(a) Archaeopteryx (b) Euglena
(c) Neopilia (d) Latimeria

DUMET-2005 / Rajasthan PMT-2003
UP CPMT-2003

Ans. (a) : Archaeopteryx is considered as a connecting link between reptiles and birds because it looks like a birds and has wings like birds.
However its teeth and tail are like those of reptiles.
There by suggesting that birds have evolved from reptiles.

1007. The venom of cobra is:
(a) Neurotoxic (b) Hemolytic
(c) Cardiotoxic (d) Hepatotoxic

MP PMT-2013

Ans. (a) : The venom of cobra is neurotoxic. It affects the nervous system. It contains proteins and enzymes that interfere with nerve signals, leading to paralysis and potentially respiratory failure in its prey.

1008. One of the following is a poisonous snake:
(a) Enhydrina (b) Typhlops
(c) Python (d) Eryx

AP EAMCET-1998

Ans. (a) : Enhydrina commonly known as the beaked sea snake or common sea snake is the species which is highly poisonous snake.
- **Phython–** It is large and non-poisonous species.
- **Eryx–** It is non poisonous snakes commonly known as (Sand boas).
- **Typhlops–** It is also known as blind snake because eye without movable eyelids.

1009. The type in sub order Ophidia is:
(a) Amphicoelous (b) Acoelous
(c) Heterocoelous (d) Procoelous

AP EAMCET-1998
Manipal-2002

Ans. (d) : In the procoelous vertebrae, the anterior surface is concave and posterior surface convex.
• Ophidia is a group of squamate reptiles including modern snakes and reptiles including modern snakes and reptiles more closely related to snakes than to other living groups of lizards.

1010. Camouflage of Chameleon is associated with
(a) chromosome (b) chromomere
(c) chromoplast (d) chromatophore

Punjab MET-2011

Ans. (d) : Camouflage of chameleon is associated with chromatophore.
Chromatophore are pigmented cell which produce colour. In various species including fish, amphibians, reptiles chromatophore present.

1011. Olfactory organs of a snake is :
(a) Johtisons organ (b) Johansburgs organ
(c) Jacobson's organ (d) Jacksons organ

Manipal-2001

Ans. (c) : Snakes have also developed a highly a specialized scenes organs known as the Jacobson's organ which allows as the literally taste and smell the air.
The Jacobson's organ is found at the base the snakes nasal cavity.

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1012. The exact cause of death of cobra bite person is
(a) inactivation of nerves
(b) inactivation and contraction of nerve and muscle
(c) contraction of muscle and destruction of erythrocytes
(d) destruction of RBCs

BVP-2014

Ans. (a) : The exact cause of death of cobra bite person is inactivation of nerves. The venom of cobras contains neurotoxins that block the transmission of nerve impulses, which can lead to paralysis of the respiratory muscles and heart. This can lead to dead within minutes.

1013. The truly land animals are
(a) newts (b) lung-fishes
(c) salamanders (d) Calotes

J&K CET-2010

Ans. (d) : Calotes– This is known as forest lizard some other species which is type of "blood suckers" due to their red head. It is truly land species.

1014. In which animal poison gland is present?
(a) Male platypus (b) Female-Lizard
(c) Male Lizard (d) Frog

Rajasthan PMT-1995

Ans. (a) : The platypus is venomous animal. It is often known as the duck-billed platypus, is an indigenous semi aquatic egg.

1015. In which of the following reptiles four chambered heart is present?
(a) Lizard (b) Snake
(c) Scorpion (d) Crocodile

JCECE-2003
Rajasthan PMT-2002

Ans. (d) : Generally reptiles have two artia and one partially divided ventricle i.e. three chambered heart but crocodiles have 4 chambered heart among reptiles.

1016. Archaeopteryx is a connecting link between
(a) Pisces and Amphibia
(b) Reptiles and Aves
(c) Amphibia and Aves
(d) Reptiles and Mammals

DUMET-2007
Rajasthan PMT-1995
WB JEE-2015

Ans. (b) : Archaeopteryx is the connecting link between reptiles and birds as it exhibits characteristics from both of these phyla.

1017. In which of the following animal anal tail is found?
(a) Earthworm (b) Lower invertebrates
(c) Scorpion (d) Snake

BVP-2008 / Uttarakhand PMT-2007
AIPMT-2001

Ans. (d) : The presence of post and tail used for balancing is a primary feature of chordates. The post-anal tail is present in chordates at some stage in the file. The post-anal tail is the spinal cord extending beyond the animals anus situated is the posterior region. Snakes are classified in the phylum chordata while earthworm is lower invertebrates and scorpion are non-chordates.

1018. On the feeding habit, the common house lizard Hemidactylus can be termed as
(a) entomophagous (b) phytophagous
(c) saprophagous (d) sanguivorous

BVP-2011

Ans. (a) : On the feeding habit the common house lizard Hemidactylus can be termed as entomophagous.
The common house lizards belong to the genus
- Hemidactylus – they are reptiles.
- Phytophagous – feeding on plants
- Saprophagous – feeding on dead and decaying matter
- Sanguivorous – feeding on blood

1019. Snake has :
(a) movable eyelids (b) immovable eyelids
(c) no eyelids (d) eyelids in pouches

Punjab MET-2004
Haryana PMT-2000
Manipal-2000

Ans. (b) : A snake has immovable eyelids. Snakes belong to the phylum chordata, class reptilia. They comes under vertebrates.
All reptilia have movable eyelids except snakes.

1020. Which of the following one is not a snake?
(a) Rattle snake (b) Rat snake
(c) Glass snake (d) Blind snake

Rajasthan PMT-1996

Ans. (c) : Glass snake is not a true snake because it is snake look like limbless lizard in the subfamily anguinae.
Ophisaurus of commonly called glass snakes, glass lizards or joint snakes.

1021. Which one is poisonous Lizard?
(a) Flying Lizard (b) Granular Lizard
(c) Sand Lizard (d) Beaded Lizard

AMU-2011 / Haryana PMT-1999
Rajasthan PMT-1996

Ans. (d) : The poisonous lizard are mexical beaded lizard and gila monster are the only venomous lizard both have share many character.
- Both have bony studs called osteoderms over their upper bodies. giving them a beaded appearance.
- Venom is produced from gland for defense against predator and venom by grooved teeth and chewed.
- Draco genus of Reptilia is known as flying lizard. Flying dragons or gliding lizards and not poisonous.
- Lacerta agilis is called sand lizard.

1022. Which of the following branch of biology is correctly matched?
(a) Ornithology - Study of mammals
(b) Herpetalogy-Study of molluscs
(c) Ophiology-Study of snakes
(d) Therology-Study of birds

MGIMS Wardha-2014

Ans. (c) : Ophiology is the branch of herpetology dealing with snake.
- Herpetalogy is the branch of zoology dealing reptiles and amphibian.
- Ornithology is a branch of zoology dealing with the study of bird.

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1023. Ornithorhynchus is a connecting link between
(a) fishes and amphibians
(b) Annelida and Arthropoda
(c) Annelida and Mollusca
(d) reptiles and mammals

KVPY SA-2016
MGIMS Wardha-2014

Ans. (d) : Ornithorhynchus (Duck-billed platypus) is connecting link between reptiles and mammals.
- Lungfish (Protopterus) is the connecting link between fishes and amphibians.
- Seymouria and sphenodon is connecting link between, amphibian and reptile.
- Peripatus is a connecting link between annelida and arthrododa
- Neopilina is a connecting link between annelida and mollusca.

1024. The fangs of python which pulled out can
(a) not come again
(b) come again with half the length
(c) come again with same length
(d) come again with double length

Manipal-2012
AFMC-2002

Ans. (c) : The fangs of a python can re-grow. In fact, snakes replace all of their teeth regularly, including their fangs. The process of replacing a fang is called ecdysis, or shedding. When a fang is shed, a new fang is already growing in behind it. The new fang will eventually grow to the same length as the old fang.

1025. Loreal pit in vipers act as which receptor?
(a) Photo (b) Thermo
(c) Auditory (d) Gastatory

Manipal-2011
AP EAMCET-2002

Ans. (b) : Loreal pit present on the vipers head and enabling pit vipers to maintain their body temperature. Loreal pit located behind the nostril and centre of each eye and covered by lacunas scales.
- Gastatory is touch sensitive receptor.
- Photoreceptor is found in green plant.
- Auditory is a hearing receptor.

1026. Which snake feed on another snake is
(a) black cobra (b) king cobra
(c) rattle snake (d) anaconda

J&K CET-2009

Ans. (b) : King cobra is ophiophagy snake. It is venomous snake. The king cobra is famous for its diet of other snake.
The king cobra (ophiophagus hannah) is the world's longest venomous snake, which can be measured upto 6.7 meters or 22 feets in length.

1027. Snake, a terrestrial animal that excretes nitrogen wastes in the form of uric acid is known as
(a) uricotelic
(b) ureotelic
(c) ammoniotelic
(d) Not confirmed for any type

J&K CET-2014

Ans. (a) : Snakes are known as uricotelic animals. Uricotelism means the process of excreting nitrogenous waste in the form of uric acid. The adaptation is advantageous for animals with limited water availability, as uric acid is less soluble in water compared to other nitrogenous waste products like ammonia and urea.

1028. A lizard-like member of Reptilia is string on a tree with its tail coiled around a twig. This animal could be
(a) Hemidactylus showing sexual dimorphism
(b) Varanus showing mimicry
(c) Calotes (garden lizard) showing camouflage
(d) Chamaeleon showing protective colouration

Rajasthan PMT-2010

Ans. (d) : A lizard-like member of Reptilia is string on a tree with its tail coiled around a twig. This animal could be Chamaeleon showing protective colouration.
- Chameleon (girgit) shows defensive colouration with its surrounding e.g. known as twig

1029. Post anal tail can be traced in
(a) cobra (b) earthworm
(c) scorpion (d) centipede

AMU-2011
CMC Ludhiana-2008

Ans. (a) : Post anal tail is a basic characteristic of chordates such like some reptile like cobra. It help in the balancing and direction of body. It is the posterior elongation of body of chordata (reptiles) out of the anus and that tail is covered with scale.

1030. In which of the following sub - classes of Reptile the skull has a solid roof ?
(a) Anapsida (b) Diapsida
(c) Segnapsida (d) Parapsida

VMMC-2006 / AMU-2007

Ans. (a) : Anapsida skull is called solid roof because in this skull there is no opening in temporal fenestry. Due to lack of opening it become solid so called social roof. Turtle is the example of Anapsidan skull. Anapsida is a sub class of reptiles.

1031. Teeth are absent in
(a) fishes (b) reptiles
(c) frogs (d) turtle

CG PMT-2007

Ans. (d) : Turtles include terrestrial, marine and freshwater species, having a shell made up of a dorsal carapace and a ventral plastron. Teeth are absent in them having being replaced by a horny beak.
- No species of turtle has teeth. The reason is that they are not required to eat their food.

1032. Poisonous sea-snakes possesses a:
(a) compressed tail (b) printed tail
(c) depressed tail (d) conical tail

Uttarakhand-2005
CG PMT-2009

Ans. (a) : Sea snakes are completely aquatic and have adapted to sea environment in many ways. The tail are compressed and become paddle like which help in the swimming and direction. The sea snake which tail become paddle (compressed) like are poisonous and pointed tail of snake are non-poisonous.

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1033. The reptilian character of prototheria is:
(a) Diaphragm
(b) T-shaped interclavicle
(c) Seven cervical vertebrae
(d) Only one aortic arch present

AP EAMCET-2001

Ans. (b) : The reptilian character of prototheria is the presence of a T-shaped interclavicles bone. The interclavicles is a bone found in the shoulder region, and its T-shaped structure is feature commonly seen in reptiles.

1034. Viper venom affects:
(a) circulatory system (b) nervous system
(c) respiratory system (d) none of the above

AFMC-2004

Ans. (a) : Viper venom affects is circulatory system. The evidence in experimental animals on the mechanisms of venom action in relation to changes in either external or internal factors is considered. the cardiovascular system and renal haemodynamics are affected by the venom.

1035. Moulting in snakes is done by shedding
(a) Cornified cells
(b) Stratified germinativum
(c) Epidermis
(d) Dermis

MGIMS Wardha-2011

Ans. (a) : Snakes shed their old skin through moulting, a process where the outermost layer of cornified cells is shed. This helps them grow, remove parasites, and renew their appearance.

1036. The extinct reptiles without temporal fossae belong to
(a) Chelonia (b) Synaptosauria
(c) Ichthyopterygia (d) Cotylosauria

Manipal-2009

Ans. (d) : The extinct reptiles without temporal fossae belong to cotylosauria.

1037. Tachyglossus is a connecting link between
(a) reptiles and birds
(b) amphibians and reptiles
(c) birds and mammals
(d) reptiles and mammals

DUMET-2009

Ans. (d) : Tachyglossus (echidna) an ant eater is a connecting link between reptiles and mammals due to its egg-laying reproduction and primitive reptilian characteristics, even though it is a mammal that produces milk for its baby.

1038. Reptilian feature of Archaeopteryx:
(a) feathers with barbules
(b) presence of abdominal ribs
(c) U-shaped furcula
(d) presence of beak.

AP EAMCET-2002

Ans. (b) : Reptilian feature of Archaeopteryx is presence of abdominal ribs, jawed teeth, clawed finger long and scally tail with free caudal vertebrae and presence of abdominal ribs. . It is connecting link between reptiles and aves.

1039. Which one of the following is a viviparous non-poisonous snake?
(a) Uropeltis (b) Enhydrina
(c) Ptyas (d) Ech is carinata

AP EAMCET-1997

Ans. (a) : In Uropeltis, tail is short and found in a large flat rough shield so it is named rough tailed snake. it is the viviparous, non-poisonous snake.
• U. macrolepis, commonly known as the Bombay earth snake, the Bombay shield tail, and the large- scaled shield tail, is species of snake in the family Uropeltidae.
• The species are endemic to southern India.

1040. A connecting link demonstrates characteristics of more than one groups. What will be the connecting link between reptiles and mammals from those given below ?
(a) Chimaera (b) Balanoglossus
(c) Neopilina (d) Echidna

VMMC-2015

Ans. (d) : Spiny ant eaten have some character like their legs on the side as dianosours rather than underneath them and presence of cloaca like reptiles to lay egg in the pouch. While the presence of hair and they produced milk for nourishment of children.

1041. Gynacomastism" is characteristic feature of:
(a) oviparous mammals (b) pouched mammals
(c) oviparous reptiles (d) viviparous snakes

AP EAMCET-2000

Ans. (a) : Gynacomastism is a phenomenon where the breast gland tissue increased and developed in male due to imballance of hormones like estrogen and testosteron. Gynacomastism is a phenomenon of development of mammary gland in male. In these, both male and female suckle the young one. It is found in oviparous mammals like platypus, Echidna and other monotremate mammals.

1042. Kidney of adult reptiles are
(a) mesonephric (b) metanephric
(c) pronephric (d) both (a) and (b)

AMU-1996

Ans. (b) : Reptiles, birds, and mammals all have a meta nephric kidney.
• The glomeruli are well developed in this type of kidney.
• The excretory process is aided by the metanephric kidneys.
• These are paired structures found in the abdominal region.
• They are made up of nephron units that are involved in blood filtration and the elimination of nitrogenous wastes from the body.

1043. A snake is identified to be having large hexagonal vertebral and the dorsal surface bluish with narrow white streaks, it is
(a) Echis carinata
(b) Bungarus coeruleus
(c) Vipera russelli
(d) Hemibungarus

Manipal-2010

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Ans. (b) : Bungarus coerules (Kraits) is highly poisonous snake. Common krait has black or steel grey colour with white arches on the back. central scales of back are larger arid hexagonal. Viper russelii is a poisonous snake with triangular head having V-mark. Mark has 3 rows of black spots appearing like chain.

• Hemibungarus is a venomous elopid snake. it is commonly known as coral snake or oriental coral snake.

1044. Which one of these does not belong to the order Galliformes?

(a) Jungle fowl (b) Peacock
(c) Phesant (d) Green parrot

Haryana PMT-2011

Ans. (d) : In the classification of aves galliformes is an order where ground feeding heavy-bodied birds are classified in which turkey, chickens, quail and other running fowl catagories. Indian pea fowl (Pavo cristatus), red jungle fowl, golden pheasant and great curassow. While green parrot is classified under psittacipormes order of aves.

1045. Which of the following is not a characteristic of snakes ?

(a) Eggs (b) Sternum
(c) Scales (d) Kidney

AMU-2003

Ans. (b) : Sternum is not a characteristic of snakes.
Sternum also called breastbone, that lies in the middle of the frontal part of the chest.

• It is first appeared in Amphibians.

1046. Cleidoic eggs are found in

(a) fishes (b) amphibians
(c) few reptiles (d) none of these

CMC Ludhiana-2011

Ans. (c) : Cleidoic egg:- cleidoic egg are defined as having a thick, rigid outer shell made of calcium carbonate

- Bird and Reptile that lay eggs has cleidoic eggs which are an adaptation for the land.
- Cleidoic egg has a protective shell, and is laid out of water. The shell is porous to air and may be flexible or calcareous (hard).

1047. Regeneration of tail in lizard is an example of:

(a) Morphogenesis (b) Parthenogenesis
(c) Epimorphosis (d) Heteromorphosis

Manipal-2002

Ans. (c) : Epimorphosis : This type of regeneration is seen is both Animal and plant. In some species the epimorphosis process undergoes differentiation to form a relatively undifferentiated mass of cell that redifferentiate to form the new structure.

Example:- Regeneration of planarian, regeneration of tail in lizard.

1048. A snake is identified to be having large hexagonal vertebrals and the dorsal surface bluish with narrow white streaks, it is :

(a) echis carinata (b) bungarus coeruleus
(c) vipera russelli (d) hemibungarus

AP EAMCET-2006

Ans. (b) : Bungarus (kraits) are highly poisonous snakes. This nocturnal snake inhibits a wide variety of habitats. Found in Indian subcontinent, in south east Asia and in southern china.

Which is black or steel grey colour with white arches on the back. Central scales of back are larger and hexagonal.

1049. The characteristics of class Reptilia are :

(a) Body covered with dry and cornified skin scales over the body are epidermal they do not have external ears
(b) Body covered with moist skin which is devoid of scales, the ear is represented by a tympanum, alimentary canal, urinary and reproductive tracts open into a common cloaca
(c) Fresh water animals with bony endoskeleton, air-bladder to regulate buoyancy
(d) Marine animals with cartilaginous endoskeleton, body covered with placoid scales

NEET (Karnataka)-2013

Ans. (a) : Reptiles are mostly terrestrial animals. The body is coated in dry, cornified scales and organisms calssified as Reptilia are cold-blooded. They all have three chambers in their hearts and breathe through their lungs, with the exception of crocodiles. They have tympanums instead of external ears. Reptiles poikilotherms. snakes and lizard shed their scales as skin cast. Sexes are separate. They are oviparous and development is direct.

1050. Reptiles like mammals originated in

(a) Jurassic (b) Triassic
(c) Cretaseus (d) Permian

AIPMT-1999

Ans. (b) : Between 252 and 201 million years ago, during the Triassic period, reptiles of the order therapsida gave rise to mammals.

Therapsids, member of the sub family synapsida (also known as the mammal-like reptiles) were often unimpressive in comparison to other reptiles of their period.

1051. Syndactyly, prehensile tail and long protrusible tongue are the unique features of

(a) Horse fish (b) Chameleon
(c) Rhesus monkey (d) Archaeopteryx

Karnataka CET-2008

Ans. (b) : Syndactyly, prehensile tail and long protrusible tongue are the unique features of chameleon. Chameleons can also change their skin colour.

Chameleon comes under sub- order - lacertilia that induces lizards of order squamata.

1052. Which of the following character is not related to Indian chain viper?

(a) Large black rings occur in three rows on the dorsal surface of the body
(b) Subcandals are present in two rows
(c) An arrow mark (↑)is present on the head
(d) Head is triangular covered by small scales

AP EAMCET-2013

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Ans. (c) : The Indian chain viper is known for its distinctive chain-like pattern on its back and its head is triangular covered by small scales. A part from it, subcandals are present in two rows, contributing to its unique physical features. However, the presence of an arrow mark on the head is not characteristic associated with the Indian chain viper.

1053. The extinct reptiles without temporal fossae belong to

(a) Chelonia (b) Synaposauria
(c) Ichthyopterygia (d) Cotylosauria

AP EAMCET-2009

Ans. (d) : Extinct reptiles without temporal fossae, which are openings in skull, belong to the group Cotylosauria. These reptiles had a unique skull structure that distinguished them from other group like chelonian, synapsida and Ichthyopterygia.

1054. A four chambered heart is not found in …….

(a) Snake (b) Crocodile
(c) Mammals (d) Birds

Karnataka CET-2004

Ans. (a) : A four chambered heart is not found in snake. They have a three chambered heart instead. In contast crocodiles, mammals and birds have four-chambered hearts that efficiently separate oxygen-rich and oxygen poor blood.

T. Aves / Birds

1055. Sound box of birds is called

(a) pygostyle (b) larynx
(c) syrinx (d) synsacrum

Rajasthan PMT-2011 / Haryana PMT-2002
AIPMT-1992 / AMU-2014 / BVP-2001

Ans. (c) : Sound box of birds is called syrinx.
Syrinx produces sound without the vocal folds of mammals. This is the organ found near the base of the trachea in birds.

1056. In birds the B-Iymphocytes mature in:

(a) thyroid gland (b) bone marrow
(c) green gland (d) bursa of fabricius

AP EAMCET-2001
AP EAMCET-12.07.2022 Shift-II

Ans. (d) : In birds the B-Iymphocytes mature in bursa of fabricius. The bursa of fabricus is a primary lymphoid organ in birds that is responsible for the amplification and differentiation of B-lymphocytes which are capable of local antibody production.

1057. Which one of the following organisms bears hollow and pneumatic long bones?

(a) Ornithorhynchus (b) Neophron
(c) Hemidactylus (d) Macropus

NEET-2021

Ans. (b) : Hollow and Pneumatic long bones are present in animals that comes under the class Aves. A for example–**Neophron,** it is commonly known as vulture.

- Ornithorhynchus (Platypus) – duck like bird snout belong to class: Mammalia.
- Hemidactylus (Wall lizard) is a member of class: Reptilia.

1058. Urinary bladder is absent in

(a) reptiles (b) aves
(c) amphibians (d) mammals

AP EAMCET-03.09.2021 Shift-I
AMU-2002

Ans. (b) : The Urinary bladder is absent in class Aves which includes birds. They lack a urinary bladder because the waste product is mostly uric acid. They are uricotelic in nature and excrete waste with feces.

1059. Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system

(a) Amphibia (b) Reptilia
(c) Osteichthyes (d) Aves

NEET-2018

Ans. (d) : Crop and gizzard are found in the digestive tract of birds (Aves). Crop helps in storage and softening of food particles whereas gizzard (muscular stomach) helps up in its crushing and churning.

1060. Choose the correct match:

(a) Aves – Pneumatic bones
(b) Reptiles – 4 chambers heart
(c) Amphibia – Scales on body
(d) Osteichtyes – Persistent notochord

AIIMS-26.05.2018 Shift-II

Ans. (a) : Pneumatic bones are mostly found in birds (Aves). They help in flight and respiration because they are hollow and light weight bones.

- Four chambered heart is found in the **reptile** crocodile, Although **reptiles** show three - chambered heart generally, Thus, the crocodiles is an exception to it. It carries two auricles and two ventricles, just like mammals,
- **Amphibian** skin is thin, moist and devoid of scales.
- **Osteichthyes**, popularly referred to as the bony fish, is a diverse, super class of fish that have skeletons primarily composed of bone tissue.

1061. The major excretory product of birds is

(a) Urea (b) Uric acid
(c) Nitrates (d) ammonia

KVPY (SA)-05.11.2017

Ans. (b) : Uric acid is considered as a major excretory product mainly in birds, reptiles and terrestrial arthropods

1062. Life span of parrot is?

(a) 140 years (b) 60 years
(c) 80 years (d) 40 years

AIIMS-2011

Ans. (a) : In any natural organism the life span depends upon between the birth and the natural death.
The approx life span in parrot is 140 year.

1063. National bird of India is:

(a) Psittacula (b) Passer domesticus
(c) Pavo cristatus (d) Parakeet

AIIMS-2009 / Rajasthan PMT-2000

Ans. (c) : India's national bird is the peacock and its scientific name is Pavo cristatus.

- The peacock was proclaimed as the national bird of India in 1963.

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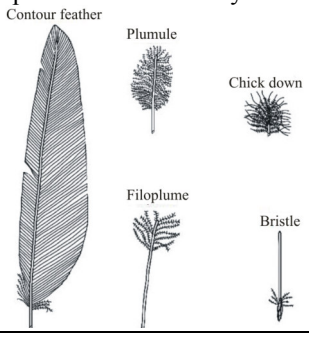
1064. Delicate hair-like feathers which remain sparsely distributed over the body are?
(a) Coverts (b) Filoplumes
(c) Plumules (d) Remiges
AIIMS-2009

Ans. (b) : Delicate hair- like feathers which remains sparsely sparsely distributed over the body are Filoplumes.
They are a type of feather generally found in birds. They are hair-like feathers with a small tuft of barbs at the tip and a small, inconspicuous shaft filoplumes do not play a significant role in flight or insulation but are believed to have sensory functions, helping birds defect changes in the position of their body feathers.



1065. Which of the following are uricotelic animals?
(a) Rohu and frog
(b) Camel and frog
(c) Lizard and crow
(d) Earthworm and eagle.
AIIMS-2002

Ans. (c) : Organism whose principle excreta is uric acid are called uricotelic animals and the process of elimination of uric acid is called uricotelism. e.g. insect, reptiles and birds are uricotelic animals.

1066. Bird vertebrae are
(a) acoelous (b) heterocoelous
(c) amphicoelous (d) procoelous
AIPMT-1988 / AIIMS-1999

Ans. (b) : In Birds heterocoelous (saddle shaped) vertebrae are present and these are characteristic of bird's necks. It provide flexibility for the movement.

1067. Feet of kingfisher are modified for
(a) wading (b) perching
(c) running (d) catching
AIPMT-1988
Punjab MET-2011

Ans. (a) : In the kingfisher, feet is modified for wading. kingfisher if flash-eating bird.

1068. Both male and female pigeons secrete milk through
(a) salivary glands
(b) modified sweat glands
(c) crop
(d) gizzard
AIPMT-1988

Ans. (c) : Both male and female pigeon secrete milk through crop during breeding season. It is formed by the degeneration of the epithelial cells lining the crop. The milk included water, fat, protein and lactose.

1069. Flight muscles of bird are attached to
(a) clavicle (b) keel of sternum
(c) scapula (d) coracoid
AIPMT-1989
J&K CET-2001

Ans. (b) : The flight muscles of birds are attached to an extension of the sternum. It is also known as carina.
Flight muscles hepl to fly of birds. kell is the extension of the sternum of birds.

1070. Penguin occurs in
(a) Australia (b) Antarctica
(c) Africa (d) America
AIPMT-1990

Ans. (b) : Penguins occur in Antarctica, (lower southern hemisphere) It is the a group of aquatic, flightless birds.

1071. Which is common between ostrich, penguin and kiwi?
(a) Running birds (b) Migratory birds
(c) Flightless birds (d) Four toed birds
AIPMT-1993

Ans. (c) : Flightless birds are birds that through evolution lost the ability to fly. ostrich, penguin and kiwi are flightless birds. emu, cassowary and rhea are also flightless bird.

1072. The skull of a bird is
(a) dicondylic (b) mono condylic
(c) amphicondylic (d) none of these
Punjab MET-1999

Ans. (b) : The skull of a bird is mono condylic.
This means that it has a single occipital condyle, a rounded projection at base of the skull that articulates with the first vertebra. This unique feature allows birds to have a greater range of head movement and contribute to their ability to fly.

1073. Some vertebrae in birds fuse to form:
(a) sacrum (b) synsacrum
(c) coccyx (d) none of these
AFMC-2005

Ans. (b) : Some vertebrae in birds fuse to form synsacrum.
The syncacrum is a skeletal structure of birds, in which the sacrum is extended by incorporation of additional fused or partially fused caudal or lumbar vertebrae and it can only be seen in birds. Some posterior thoracic vertebrae, the lumbar, sacral and a few anterior caudal vertebrae are fused to form a complex bone called synsacrum.
• The innominate bones are fused with the synsacrum to a greater or lesser extent, according to species, forming an avian pelvis.

1074. Which of the following group of animals maintains high and constant body temperature such as mammals?
(a) Reptiles (b) Amphibians
(c) Birds (d) Fishes
AFMC-2005

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Ans. (c) : Birds belongs to class Aves. Birds and mammals are Homeotherms.
Homeothermy, also known as endothermy, refers to the ability of an organism to maintain a relatively constant body temperature, regardless of the external temperature fluctuations.
Hence, birds maintains high and constant body temperature such as mammals.
Birds, Amphibians and fishes are poikilothermic animals (cold blooded).

1075. The red jungle fowl is
(a) Gallus gallus (b) Ravo cristatus
(c) Choriotis nigriceps (d) Raja hansa
AMU-2015

Ans. (a) : The red jungle fowl is Gallus gallus which is a tropical birds belongs to family phasianidae. It is widespread throughout south and South East Asia. It is formely known as the bankiva or bankiva fowl. In India, it is found in panchkula distic in Haryana.

1076. Which one is the most important characteristic feature of birds?
(a) Forelimbs modified into wings
(b) Bipedal vertebrate
(c) Homoiothermal
(d) Exoskeleton of feathers
BVP-2010

Ans. (d) : Exoskeleton of feathers is the most important characteristic feature of birds.
The aves belong to the phylum chordata of the animal kingdom.
Characteristics of Aves-
- Birds are worm-blooded animals.
- Their forelimbs are modified into wings.
- There are epidermal scales on their legs.
- The endoskeleton is bony with long hollow pneumatic bones.
- Features are an exoskeletal structure which is a characteristic feature of birds. The feathers can be useful for sexual attraction between the two sexes in birds for the process of sexual Reproduction.

1077. The scientist, who described the birds as glorified reptiles, was :
(a) Romer (b) Huxley
(c) Mendel (d) Robert Hook
JIPMER-2004
Punjab MET-2003

Ans. (b) : The scientist, who described the birds as glorified reptiles, was Huxley. He described the birds as glorified reptile. It is typically believed that each mammals and birds are derived from reptiles.
- Archaeopteryx is a fossil bird showing each reptile and bird features.

Hence, birds are known as glorified reptiles by Huxley.
- He was known as "Darwin's Bulldog" for his advocacy of Charles Darwin's Theory of Evolution.

1078. Incomplete division of egg during cleavage is known as :
(a) meroblastic (b) holoblastic
(c) meridional (d) spiral
JIPMER-2004 / Punjab MET-2003
MP PMT-1996,1999

Ans. (a) : Incomplete division of egg during cleavage is known as meroblastic. It refers to a type of a cleavage in embryonic development where only a portion of the egg divides, resulting in an embryo that is partially surrounded by yolk. This type of cleavage is common in eggs with a large amount of yolk, such as bird eggs.

1079. Beak is toothed in
(a) pelican (b) kiwi
(c) ostrich (d) Archaeopteryx
MGIMS Wardha-2007 / Rajasthan PMT-2006
BVP-2012

Ans. (d) : Beak is toothed in Archaeopteryx. It is a genus of feathered dinosaurs that lived around 150 million years ago during the late Jurassic period. It is often considered as transitional form between dinosaurs and modern birds due to its combination of reptilian and avian features. The fossils of Archaeopteryx provide valuable insights into the evolutionary link between reptiles and birds.

1080. Pigeon is a
(a) oviparous organism
(b) viviparous organism
(c) ovo-viviparous organism
(d) None of the above
J&K CET-2014

Ans. (a) : Pigeon is a oviparous organism.
Oviparous animals are those animals in which fertilissation generally takes place internally but embryo development takes place externally. Birds, Reptiles and Amphibians are oviparous.
Offsprings of oviparous animal are at greater risk of survival compared to viviparous animals.

1081. Synsacrum of fowl consists of about
(a) 29 vertebrae (b) 3 vertebrae
(c) 16 vertebrae (d) single vertebrae
UP CPMT-2008 / Uttarakhand PMT-2008
VMMC-2012

Ans. (c) : The synsacrum of fowl consist of about 16 vertebrae.
The synsacrum is a skeletal structural of birds and other danseurs, in which the sacrum is extended by incorporation of additional fused or partially fused caudal or lumbar vertebrae. This structure is only found in birds. It is formed by the fusion of 16 vertebrae these are last thoracic vertebra, six lumbar vertebrae, two sacral vertebrae and seven caudal vertebrae.

1082. Characteristic features such as four-chambered heart, feather and pneumatic bone is applicable to the class of vertebrate
(a) Cyclostomata (b) Aves
(c) Reptilia (d) Mammalia
CG PMT-2007 / J&K CET-2006

Ans. (b) : The feathers of the birds are the single external feature to distinguish birds from other vertebrates.
- The presence of hollow and light bones is a characteristic feature of birds that helps them to reduce body weight.
- The forelimbs are specially modified for flight, having a large surface area and very little weight.
- Birds have 4-chambered hearts made of the right atrium, right ventricle, left atrium and left ventricle.

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1083. The bird without pecten is:
(a) Pteropus (b) Apteryx
(c) Eryx (d) Gallus
AP EAMCET-2004

Ans. (b) : Bird without pecten is apteryx.
Pecten is a soft rectangular highly vascular pigmented folded structure. It is present in eyes of all birds except apteryx.
- The pecten solves this problem by greatly reducing the number of blood vessels in the retina.
- This also leads to the extremely sharp eyesight of birds such as howks.

1084. The largest endangered bird in India is
(a) vulture
(b) flamingo
(c) great indian bustard
(d) great indian hornbill
CG PMT-2009
Haryana PMT-2009

Ans. (c) : The great Indian bustard, the bird of Rajasthan, is considered Indian's most critically endangered bird.
- It is considered the flagship grassland species that represents the health of the grassland ecology.
- Its population is confined mostly to Rajasthan and Gujarat. Small populations occur in Maharashtra, Karnataka and Andhra Pradesh.

1085. The long bones are hollow and connected by air passage. These are characteristic of
(a) Mammalia (b) Aves
(c) Reptilia (d) Sponges
AMU-2006

Ans. (b) : The long bones are hollow and connected by air passage. These are characteristic of aves.
Aves are the animals that fly so their body weight should be less and for this their bones are hollow and connected by air passages.
• Reptilia, land vertebrates and mammals do not have hollow bones.
Most of the bones are pneumatic bone and filled with air sacs.

1086. Quill feathers at the base of quill wings are called :
(a) remiges (b) barbules
(c) coverts (d) down feathers
DUMET-2001

Ans. (c) : Quill feathers at the base of quill wings are coverts. Coverts feathers are small feathers that cover the bases of larger flight feathers, helping to streamline the wings and are provide additional support during flight. The name coverts indicate that they cover the other feathers.

1087. Feathers seen only in Nestlings:
(a) contour (b) filoplumes
(c) quill (d) down
AP EAMCET-2002

Ans. (d) : Nestlings are young birds that are still in the nest and are unable to fly. They are typically covered in down feathers and are cared for by their parents until they are ready to fledge (leave the nest).

1088. Bone marrow is absent in the bones of
(a) Pisces (b) Amphibia
(c) Reptilia (d) Aves
CMC Vellore-2014
BCECE-2007

Ans. (d) : Bone marrow is absent in the bones of birds (aves). Unlike mammals, where bone marrow is present in the bones and is responsible for producing blood cells, birds have a different arrangement where their bones are hollow and filled with air sacs, which helps then be light weight for flying.

1089. In which one meroblastic segmentation is found
(a) Dog (b) Monkey
(c) Owl (d) Rhinoceros
Rajasthan PMT-2000

Ans. (c) : Meroblastic segmentation is a type of embryonic development where only a part of the egg divides into smaller cells, while the rest remains undivided. In the case of the owl, this type of segmentation occurs during its early development.

1090. Which of the following sets of derivatives of integumentary structures characterise birds as glorified reptiles ?
(a) Scales and claws
(b) Syrinx and uropygial gland
(c) Claws and uropygial gland
(d) Syrinx and scales
AMU-2003

Ans. (a) : Scales and claws are integumentary structures that are characteristic of birds. Scales cover the legs and feet of birds, providing protection and support. Claws found on the tips of bird's toes, and used for perching, climbing and catching prey. Additionally, feathers are another important integumentary structure that distinguishes birds, playing a crucial role in flight, insulation and communication.

1091. Which of of the following is not a bird?
(a) Magpie (b) Albatross
(c) Himalayan quail (d) Bufo
J&K CET-2004

Ans. (d) : Among the given options, "Bufo" is not a bird. It is a genus of true toads, which are amphibians. The other options, magpie, Albatross and Himalayan quail are all types of birds.

1092. Pneumatic bones are expected to be found in
(a) house lizard (b) flying fish
(c) pigeon (d) tadpole of frog
JIPMER-2010
AFMC-2000

Ans. (c) : Pneumatic bone are hollow bones filled with air, found in Aves or birds. It makes the skeleton light in weight which makes it easy to fly.
• These bones reduce body weight and increase buoyancy thus, indirectly helping bird to fly.

1093. Which one of the following characteristics is not shared by birds and mammals
(a) Warm blooded nature
(b) Ossified endoskeleton
(c) Breathing using lungs
(d) Viviparity
NEET-2016 Phase-I

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Ans. (d) : Birds are always oviparous. Viviparity is not shared by birds and mammals. Viviparity means to give birth to young who develop inside the body of the mother rather than hatching from eggs. Mammals are viviparous and birds are oviparous.

1094. Which one of the following in birds, indicates their reptilian ancestry?
(a) Two special chambers crop and gizzard in their digestive tract
(b) Eggs with a calcareous shell
(c) Scales on their hind limbs
(d) Four-chambered heart

AIPMT-2008

Ans. (c) : As a form of adaptation to living on land, reptiles dry skin is protected from water loss by scales. In addition to having scales on their hind limbs, birds are reptile ancestors.

1095. Which of the following is a flightless bird?
(a) Ostrich (b) Emu
(c) Kiwi (d) All of these

UP CPMT-2011
JIPMER-2000

Ans. (d) : Flightless birds are birds that lost the ability to fly through evolution Ostrich, Kiwi, Emu, all are flightless bird.

U. Mammalia

1096. One of the following is a very unique feature of the mammalian body -
(a) Presence of diaphragm
(b) Four chambered heart
(c) Rib cage
(d) Homeothermy

JCECE-2015 / Punjab MET-2006
AIPMT-2004 / JCECE-2003
Rajasthan PMT-2002 / AIIMS-1998

Ans. (a) : Presence of Diaphragm is unique feature of the mammalian body.
- Diaphragm present only in mammalian body. The work of diaphragm is to separate the stomach from the heart.
- Homeothermy is found in Amphibians mammals and birds.
- Birds, mammals and crocodile have four-chambered heart.
- Rib cage is found in most tetrapod.

1097. In rabbit, head of epididymis present at the head of the testis is called
(a) Vas deferens (b) Cauda epididymis
(c) Gubemaculum (d) Caput epididymis

UP CPMT-2012 / MGIMS Wardha-2008
BVP-2007 / CG PMT-2008

Ans. (d) : In rabbit, head of epididymes present at the head of the testis is called caput epididymis. The most obvious function of the epididymis is to transport sperm from the rete testes to the vas deferens.
- Epididymes a long tube that is located near each testicle.

1098. Which of the following is viviparous?
(a) Running birds (b) Whales
(c) Bats (d) Both (b) and (c)

HP CET-2011 / BCECE-2006
VMMC-2005 / AMU-2004

Ans. (d) : Whale and bats both are viviparous. Viviparous animal gives birth to living young from within the body rather than laying eggs. Almost all mammals and some reptiles are viviparous.

1099. Mammary glands are modifications of
(a) Sebaceous glands (b) Scent glands
(c) Ceruminous glands (d) Sweat glands

TS EAMCET 10.05.2023 Shift-I

Ans. (d) : Mammary gland are modification of sweat glands. Sweat glands are type apocine gland that present surface of the skin.
Mammay glands are present in all female mammals and are generally non function in males.
They first appear in embryonic fife as clumps of cell peoliferating from a longitudinal ridge of ectoderm along the so called milk line, from the buds, or beginnings of the lower limbs to those of the upper limbs.
The number of these clumps that ultimately become breasts, or mammas varies with each mammalian species according to the size of its litter.
The glandular tissue itself is made up of 15- 20 lobes composed of solid cords of ducats cells each lobe is sub divided into many smaller lobules separated by broad fibrous suspensory bonds (cooper's ligaments) which connect the skin with the fascia or sheet of connective tissue that covers the pectoral muscles beneath the breast.

1100. Statement I: The animals that can withstand wide fluctuations in salinity are called eurythermal animals.
Statement II: Animals such as camels can be conformers upto a particular range of temperature and regulators afterwards.
The correct option among the following is
(a) Both statements I and II are true
(b) Both statements I and II are false
(c) Statement I is true. But statement II is false
(d) Statement I is false. But statement II is correct

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : The animals that can survival wide range of temperatures are called eurythermal animals. The animal that can survival only narrow range of lemperuture is called stenothermic.
The animals that can withstand wide fluctuation in salinity are called euryhaline.
The camels can be con formers upto a particular range of temperature and regulators after wards is a example of eurythermal animal.

1101. Rats belong to the class
(a) Rodentia (b) Cetacea
(c) Mammalia (d) Carnivora

AP EAPCET-22.05.2023, Shift-II

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Ans. (c) : The classification of rat	
Domain	Eukaryota
Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Clade	Simplicidentata
Order	Rodentice

Rat are various medium-sized, long tailed rodents. Rat are also called mice by their size.
The best known rat species are the black rat and brown rat.
The rat use in subjects for scientific research.
The class mammalian is characterized by the presence of milk-producing mammary gland for feeding their young and outhe character is a neocortey region of the brain, for or hair and three middle ear bones.

1102. The unique mammalian characteristics are:
(a) pinna monocondylic skull and mammary glands
(b) hairs, tympanic membrane and mammary glands
(c) hairs, pinna and mammary glands
(d) hairs, pinna and indirect development

NEET (UG) 07.05.2023

Ans. (c) : Animals belonging to C (as) mammalian are referred to as mammals.
- Mammals are worm-blooded animals who give birth to their young one's (Viviparity)
- They have mammary glands that help them produce milk to feed their younger ones.
- Mammals have several cervical vertebra.
- Hairs presents throughout the body which helps animals adapted to their environment.

1103. In mammals, dentition is
(a) Acrodont and homodont
(b) Homodont and thecodont
(c) Acrodont and heterodont
(d) Thecodont, heterodont and diphyodont

AP EAMCET-12.07.2022 Shift-II

Ans. (d) : Human dentition is described as thecodont diphyodont and heterodont. It is called thecodont type because each tooth is fixed in a separate socket present in the jaw bones.
It is called diphyodont type because we get only two sets of teeth, milk teeth and permanent teeth.
Heterodont – An adult human has 32 permanent teeth which are of 4 different types (Heterodont dentition), namely incisors (I), canine (C), premolares (PM) and molars (M).

1104. Match the following related to adaptation in aquatic habitat?

List-I	List-II
(i) Gelatinous cocoon	(A) Cartilaginous fishes
(ii) Salty fluid that drips through nostrils	(B) Salmon
(iii) Trimethyl amine Oxide	(C) African lung fish
(iv) Anadromous migration	(D) Penguins

(a) (i–D), (ii–C), (iii–B), (iv–A)
(b) (i–C), (ii–D), (iii–A), (iv–B)
(c) (i–A), (ii–D), (iii–C), (iv–B)
(d) (i–A), (ii–B), (iii–D), (iv–C)

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Gelatinous cocoon- African lung fish
Salty fluid that drips - penguins
through nostrils -
Trimethyl amine oxide - Cartilagenous fishes
Anodromous migration - Salmon.

1105. The smallest mammal is _____ .
(a) Hog Nose Bat (b) Pigmy water shrew
(c) Pigmy Mole (d) Plasmodium

AP EAMCET-03.09.2021 Shift-II

Ans. (a) : The smallest mammal is Hog Nose Bat. It is commonly known as bumblebee bat. It measures around 1 to 1.3 inches in length & weights around 2 grams.

1106. Assertion (A) : Mammals have a relatively large brain when compared to that of other animals in relation to body size.
Reason (R) : Number of optic lobes is four in the mammals and two in others vertebrates.
(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct and R is not the correct explanation of A.
(c) A is correct but R is wrong.
(d) A is wrong but R is correct.

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Mammals have a large brain for their body size than most members of other vertebrates. Number of optic lobes is four in the mammals & 2 in other vertebrates. Hence, option (b) is correct.

1107. Study the following table and pick up the correct combinations.

	Class	Common name of animals	Special feature
I	Echinoidea	Sea urchins	Aristotle's lantern
II	Cephalopoda	Clams	Crystalline style
III	Holothuroidea	Sea cucumbers	Respiratory trees
IV	Gastropoda	Squids	Torsion

Options:
(a) II, IV (b) I, III
(c) I, II (d) II, III

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Conjugation : conjugation is the process by which one bacterium transfers genetic material to another through direct contact.
- During conjugation one bacterium serves as the donor of the genetic material and the other serves as the recipient.
- The Donor bacterium carries a DNA sequence called the fertility factor, or F-factor.

1108. Which among the following is a Metatherian mammals ?
(a) Kangaroo (b) Echidna
(c) Shrew (d) Pangolin

AP EAMCET-25.09.2020 Shift-II

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Ans. (a) : Masupials are a type of metatherian mammals that include kangaroos. Kangaroos are marsupials that are known for their powerful hind legs. Marsupials are characterized by giving birth to relatively underdeveloped offspring, which then continue to grow and develop while attached to their mother's nipples inside the pouch.

1109. Match the following

List - I	List - II
A. Anadromous	**I. Anguilla**
B. Catadromous	**II. Protopterus**
C. Diapause	**III. Lizards**
D. Aestivation	**IV. Insects**
	V. Hilsa

The correct match is

	A	B	C	D
(a)	V	I	IV	II
(b)	V	I	III	IV
(c)	II	IV	I	IV
(d)	III	II	I	IV

TS EAMCET-29.09.2020 Shift-I

Ans. (a) : Anadromous - Hilsa
Catadromous - Anguilla
Diapause - Insects
Aestivation - protopterus.

1110. Structure analogous to the placenta in mammals.

(a) Chorion (b) Amnion
(c) Yolk sac (d) Allantois

JIPMER-2019

Ans. (a) : The chorion is a membrane that surrounds a developing fetus which is associated with the amnion. The chorion plays a vitat role in the exchange of blood and gases between mother and fetus. The chorion also functions to eliminate fetus waste.

1111. Which all belong to the same phylum?

(a) Mammalia – Balaenoptera, Delphinus, Rattus, Felis
(b) Porifera – Euspongia, Scypha, Pennatula
(c) Arthropoda – Crab, Limulus, Aplysia, Cockroach
(d) Coelentrata – Hydra, Gorgonia, Obelia, Sycon

AIIMS-26.05.2018 Shift-I

Ans. (a) : Balaenoptera is blue whale, Delphinus is Dolphin Rattus is rat and Felis is cat ,all belong to the same phylum chordata.

- Pennatula and Gorgonia belongs to phylum Cnidaria.
- Aplysia belongs to phylum Mollusca.
- Sycon is belongs to Porifera.

1112. Which of the following is correct

(a) Macropus– Ear pinna, body hairs, 4 chambered heart
(b) Pavo–Long bones ossified, fore limbs modified to wings
(c) Ichthyophis–covering on eyelids, Scales present
(d) Limulus–chitinous exoskeleton, 3 pair of legs

AIIMS-26.05.2018 Shift-II

Ans. (a) : Macropus is a marsupial genus that belongs to the family macropodidae.

- This genus includes all terrestrial kangaroos.
- Macropus have Ear pinna, body hairs and 4 chambered heart.
- Macropus have hair on skin and pinna, belongs to class mammalian.

1113. Select the incorrect –

(a) Annelida – Nereis, Hirudinaria, Lumbricus
(b) Echinodermate–Echinus, Cucumaria, Asterias
(c) Reptilia–Hemidactylus, Ophiosaurus, Chelone
(d) Mammalia – Betta, Rattus, Felis

AIIMS-27.05.2018 Shift-I

Ans. (d) : Mammalia is a name for the group of animals that have mammary glands based on the examples, it is clear that Betta is a genus of fish that contains ray-finned fishes that are member of the super class pisces and does not belong to the mammal family. Cat species fall under the genus felis, which a member of mammalia orders.
The class mammalia includes the genus Rattus which include many types of rats.

1114. Match the animals of Column I with their respective classes in Column II and choose the correct answer :

Column I	Column II
1. Aptenodytes	**I. Aves**
2. Hemidactylus	**II. Chondrichthyes**
3. Carcharodon	**III. Mammalia**
4. Pteropus	**IV. Reptilia**
	V. Osteichthyes

Select the code for the correct answer from the options given below :

	1	2	3	4
(a)	V	II	IV	I
(b)	I	IV	III	II
(c)	V	I	II	III
(d)	I	IV	II	III

Karnataka CET-2018

Ans. (d) : Bird come under the class of Aves. They are characterized by the beaks and the feather present on their body. chondrichthyes in a class of fish that consist of cartilaginous fishes.
Mammalia is a vertebrate animal and consist of mammals. Class reptilia consist of reptile and amphibians.
Osteichthyes consist of fishes mainly bony fishes.

Sr. No.	Column-I	Sr. No	Column-II
1.	Aptenodytes	I	Aves
2.	Hemidactylus	IV	Reptilia
3.	Carcharodon	II	Chondrichthyes
4.	Pteropus	III	Mammalia

1115. The amnion of mammalian embryo is derived from

(a) ectoderm and mesoderm
(b) endoderm and mesoderm
(c) ectoderm and endoderm
(d) mesoderm and trophoblast

NEET-2018

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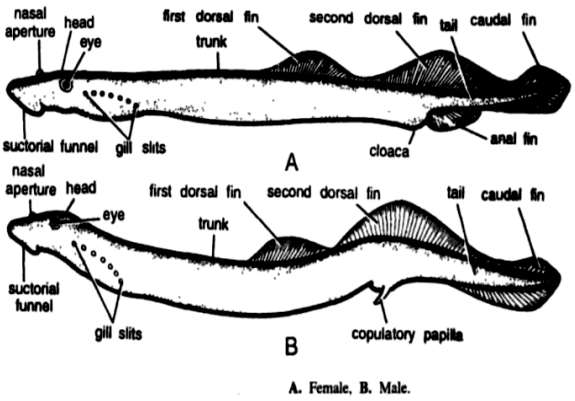
Ans. (a) : The amnion, which is a protective membrane surrounding the embryo, develops from the both the ectoderm (outermost germ layer) and the mesoderm (middle germ layer) during the early stages of embryonic development in mammals. This combination of layers forms the structure of the amnion.

1116. Which of the following does not come under the class mammals?
(a) Flying fox (b) Hedgehog
(c) Manatee (d) Lamprey

AIIMS-2007

Ans. (d) : Lampreys do not belong to the class of mammals. They are jawless fish.while Hedgehog, flying fox and Manatee all belong to the class of mammals.



A. Female, B. Male.

1117. Which one of the following is not mammalian character?
(a) Presence of milk producing glands
(b) Skin is unique in possessing hair
(c) Presence of external ears called pinnae
(d) Homodont type of dentition

AIIMS-2016

Ans. (d) : Mammals have heterodont teeth, which are different kinds (Incisor, Canine, Premolar and Molar) of teeth with distinct purposes in contrast to the majority of vertebrates, which have homodont teeth, i.e. morphologically and functionally identical.

1118. All mammals without any exception are characterized by
(a) Viviparity and biconcave red blood cells
(b) Extra-abdominal testes and a four chambered heart
(c) Heterodont teeth and 12 pairs of cranial nerves
(d) A muscular diaphragm and milk producing glands

AIIMS-2006

Ans. (d) : Mammals are characterized by having a muscular diaphragm and milk-producing glands which are unique features among animals. The diaphragm helps with breathing and the milk-producing glands are used to nourish their young. These traits distinguish mammals from other types of animals.

1119. Which animal has the longest gestation period?
(a) Shark (b) Walrus
(c) Elephant (d) Dog

AIIMS-2010

Ans. (c) : Gestation is the time of growth that occurs when an embryo or fetus is being carried inside of an animal, particularly one that is viviparous.
The normal gestation time of an elephant is around 95 weeks or almost two years. This is the longest pregnancy period one could possibly think of in the animal kingdom.

1120. Which of the following is common among mammals?
(a) They do not moult
(b) They have seven cervical vertebrate
(c) The are carnivores
(d) They have ventral nerve cord

AIIMS-2014

Ans. (b) : Mammals are commonly characterized by having seven cervical vertebrate in their necks, which sets them apart from other animals. This anatomical feature is a distinctive trait of animals.

1121. Which of the following teeth are lophodont?
(a) Incisor and canine
(b) Canine and premolar
(c) Premolar and molar
(d) Premolar and incisor

AIIMS-2002

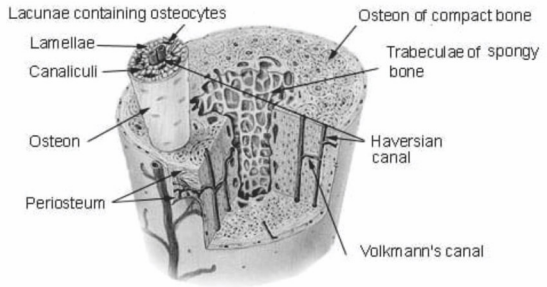
Ans. (c) : Lophodont teeth are commonly found in mammals like herbivores and have raised, ridged surfaces that help in grinding plant material. Premolar and molar refers to the type of teeth that exhibit lophodont characteristics.

1122. Haversian canal in the bone of mammals are connected by small blood vessel canal called:
(a) Schlemm's canal (b) Volkmann's canal
(c) Portal capillaries (d) Sinuses

AIIMS-2015

Ans. (b) : Volkmann's cannals are channel that run transversely through the bone, connecting the Haversian canals, and are essential for maintaining bone health and function through vascularization and communication.

Compact Bone and Spongy (Cancellous Bone)



1123. Hair occur in all mammals except those of
(a) rodentia (b) chiroptera
(c) primata (d) cetacea

AIPMT-1988

Ans. (d) : Hair is present in all mammals except those of the group cetacean, which induces whales, dolphins and porpoises. These aquatic mammals have evolved adaptations such as streamlined bodies and blubber for their marine lifestyle, leading to the loss of external hair.

@apna_pdf

1124. Eutherians are characterised by
(a) hair skin
(b) true placentation
(c) ovoviviparity
(d) glandular skin

AIPMT-1989

Ans. (b) : Eutheria includes viviparous placenatal mammlas. Eutherians are characterized by true placentation. It has a choriollantoic placenta. True placenta is absent in all marsupials.

1125. An egg laying mammal is
(a) kangaroo (b) platypus
(c) koala (d) whale

J&K CET-2005
AIPMT-1992

Ans. (b) : The platypus is a duck billed beaver-tailed, otter-footed and egg laying aquatic mammals.

1126. Role of spleen in mammal is
(a) to control blood pressure
(b) to assist liver
(c) to act as haemopoietic tissue
(d) to assist kidneys

Punjab MET-2009

Ans. (c) : Role of spleen in mammal is to act as haemopoietic tissue. The spleen is the largest lymphatic organ in the body and is positioned in the superior abdomen (tummy). The spleen has important hematopoietic functions, until the 5th month of gestation. After birth, erythropoietic functions cease, except in some hematologic disorders. As a major lymphoid organ, the spleen retains the ability to produce lymphocytes and as such, remains an hematopoietic organ.

1127. Select the correct set of animals of class-Mammalia.
(a) Lion, bat, whale, ostrich
(b) Whale, bat, kangaroo, hippopotamus
(c) Lion, hippopotamus, penguin, bat
(d) Hippopotamus, penguin, whale, kangaroo

MGIMS Wardha-2013
J&K CET-2006

Ans. (b) : Mammals are members of class mammalia. Air breathing vertebrate animals characterized by the possession of endothermy, hair, 3 middle ear bones, and mammary glands functional in mothers with young.

• Penguin and ostrich are flightless birds, Lion and Hippopotamus' are terrestrial mammals.

1128. If Henle's loop were absent from mammalian nephron, which of the following is to be expected?
(a) The urine will be more concentrated
(b) The urine will be more dilute
(c) There will be no urine formation
(d) There will be hardly any change in the quality and quantity of urine formed

MGIMS Wardha-2010

Ans. (b) : Henle's loop, also known as the loop of Henle plays a crucial role in the kidney's ability to concentrate urine if it were absent, the kidney's ability to creates concentrated urine would be compromised, leading to more dilute urine being produced.

1129. The eggs of eutherian mammals are:
(a) mesolecithal type (b) microlecithal type
(c) telolecithal type (d) megalecithal type

MGIMS Wardha-2003

Ans. (b) : The eggs of eutherian mammals are microlecithal type.

• Some Embryologists also describes microlecithal egg as alecithal eggs.

• Where mesolecithal type of egg are found in frogs and toads, telolecithal egg are found in birds, reptile and some amphibians and megalecithal egg are found in bony fishes, reptiles and monotremes.

1130. Which one of the following is a very unique feature of the mammalian body ?
(a) Homeothermy
(b) Presence of diaphragm
(c) Four chambered heart
(d) Rib cage

Manipal-2007

Ans. (b) : The presence of a diaphragm is a unique feature of the mammalian body. It is a muscular structure that separates the thoracic and abdominal cavities and plays a crucial role in breathing by contracting and relaxing to control the inhalation and exhalation of air. This feature is not found in other vertebrates groups.

1131. Ornithorhynchus is an example of
(a) dinosaur
(b) monotreme mammal
(c) marsupial mammal
(d) eutherian mammal

WB JEE-2009

Ans. (b) : Ornithorhynchus anatinus (duck-billed platypus) is a monotreme mammal, which belongs to sub-class-prototheria (Primitive egg laying mammals), order- Monotremata (living prototherians).

• The snout is soft, moist and rubbery in texture.

• Hence, ornithorhynchus is a monotreme mammal and semi-aquatic oviparous mammals.

1132. The snow leopard is
(a) Panthera pardus (b) Panthera uncia
(c) Panthera tigris (d) Hylobates hoolock

AMU-2015

Ans. (b) : The scientific name of the snow leopard is panthera uncia. Snow leopard or panthera uncia is a carnivore that belongs to class-mammalia of phylum chordata classified under Kingdom-Animalia.

• Indian leopards are also listed under the vulnerable category as per IUCN red list as there is a decrease in population.

1133. Mammals having traits of both reptiles and mammals are
(a) monotremes (b) marsupials
(c) whales (d) bats

BVP-2010

Ans. (a) : Monotremes are mammals that exhibit traits of both reptiles and mammals. They lay eggs like reptiles but still produce milk to nurse their young similar to other mammals. Examples include the platypus and echidnas.

@apna_pdf

1134. Echolocation is found in

(a) bat (b) cat
(c) dog (d) horse

UP CPMT-2003

Ans. (a) : Echolocation is a biological ability found in bats that allows them to navigate and locate prey by emitting high - frequency sound waves and interpreting the echoes that bounce back to them. This helps them build a mental map of their surroundings and hunt effectively in the dark.

1135. Milk glands are characteristics of

(a) all vertebrates
(b) only mammals
(c) only placental mammals
(d) only ruminants

Manipal-2013, 2011
Haryana PMT-1999

Ans. (b) : Milk gland are characteristic of only mammals. The most unique mammalian character is the presence of mammary glands producing milk for sucking the young. In human, mammary glands are organized in structures called breasts. Breasts have alveoli that are surrounded by milk-secreting cuboidal cells; these cells drain the milk into the nipple.

1136. Which of the following monkey has prehensile tail ?

(a) Loris (b) Tarsiers
(c) Spider monkey (d) Rhesus monkey

AFMC -2011

Ans. (c) : Spider monkeys are a type of primate found in the tropical forests of central and south America. They are known for their distinctive long limbs prehensile tail, and a lack of thumbs.

1137. Blood platelets are found only in the blood of :

(a) birds (b) reptiles
(c) mammals (d) amphibians

Manipal-2004

Ans. (c) : Blood platelets found only in the blood of mammals. Platelets are irregularly shaped membrane bound cell fragments. They usually lack nuclei and are formed from special bone marrow. They are responsible for blood clotting. They survive for 5 to 9 days before being destroyed by the spleen and liver.

1138. An egg laying mammal is

(a) Delphinus (b) Macaca
(c) Ornithorhynchus (d) Macropus

J&K CET-2008

Ans. (c) : Majority of mammals are viviparous but Ornithorhynchus is an oviparous mammal and commonly known as the platypus. Mammals give birth to their young ones so they are called viviparous. But there are some exceptions like platypus (ornithorynchus).

1139. The largest corpuscle in mammalian blood are:

(a) basophils (b) erythrocytes
(c) monocytes (d) lymphocytes

HP CET-2011

Ans. (c) : Monocytes are the largest type of white blood cells found in mammalian blood. They play a crucial role in the immune system by engulfing and destroying foreign particles, dead cells and pathogens. Monocytes can further differentiate into macrophages, which are highly effective in clearing up debris and helping to initiate immune responses.

1140. Camel in its hump stores:

(a) water for emergency
(b) fat for emergency
(c) both fat and water for emergency
(d) fat and proteins as reserve food for emergency

HP CET-2011

Ans. (b) : Camel in its hump store fat for emergency.
• Camels use the humps to store energy rich fat deposits allowing the gangly beast to travel days through the desert without stopping for a bite to eat.

1141. Which of the following is incorrectly matched?

(a) Rabbit – Microelocithal, isolecithal
(b) Frog – Mesolecithal, centrolecithal
(c) Human – Mesolecithal, ceritrolecithal
(d) Birds – Macrolecithal, telolecithal

HP CET-2011

Ans. (c) : Rabbit – Microelocithal, isolecithal
Frog – Mesolecithal, telolecithal
Human – Mesolecithal, ceritrolecithal
Birds – Macrolecithal, telolecithal

1142. The first animal domesticated by primitive man was:

(a) dog (b) horse
(c) cat (d) cow

JIPMER-2003

Ans. (a) : The first animal domesticated by primitive man was dog. Dogs were likely domesticated from wolves tens of thousands of year ago.

1143. In male mammals primary germ cell is formed by :

(a) cortex of testis
(b) medulla of testis
(c) germinal epithelium
(d) apical part of embryo

Rajasthan PMT-1998

Ans. (c) : In male mammal primary germ cell is formed by germinal epithelium. The germinal epithelium in mammals refers to the outermost layer of cells covering the ovary or testis in females it play a crucial role in producing and releasing eggs (oocytes) during ovulation. In males, it contributes to the production of sperm cells through spermatogenesis.

- In males it covers the wall of seminiferous tubules within testes.
- In female it covers the outer most layer of the ovary.

1144. Assertion (A) :- Bats and whales are classified as mammals.
Reason (R) :- Bats and whales have four chambered heart.

(a) A is correct and R is its explanation
(b) A is correct and R is also correct but R is not explanation to A
(c) A is correct and R is wrong
(d) A and R both are wrong

AMU-2011

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Ans. (b) : Bat and whale are mammals. Bats and whales are classified as mammal because they are viviparous.

- Bats are only mammals that fly.
- It gives birth to its young ones and feed milk. Having ear pinna, four chambered heart.
- Whales are the world's largest mammals. They are well known for their intelligence and for their often complex social behaviours.
- Whale is largest marine mammals which have four chamber hearts.

1145. In mammals, the lower jaw is made of:

(a) madulla (b) dentary
(c) mandible (d) ethmoid

VMMC-2006

Ans. (c) : Mandible is the largest and strongest bone in face. Mandible is the only moveable bone of the skull and is attached to muscles involved in chewing and other mouth movements also called lower jaw bone.

- Mandible forms the lower jaw and holds the lower teeth in place.

1146. 'Mammalian thymus' is mainly concerned with

(a) regulation of body temperature
(b) regulation of body growth
(c) immunological functions
(d) secretion of thyrotropin

UP CPMT-2008

Ans. (c) : The mammalian thymus is primarily concerned with immunological functions. It plays a crucial role in the development and maturation of T cells, which are important for the immune system's defense against infections and diseases. The thymus provides an environment for T cells to mature and acquire their specific functions in recognizing and fighting off harmful pathogens.

1147. The part where fertilization of ovum takes place in rabbit, humans and other placental mammals is

(a) ovary (b) uterus
(c) vagina (d) fallopian tube

UP CPMT-2001

Ans. (d) : The part where fertilization of ovum takes place in rabbit human and other placental mammal is fallopian tube. It is around 10 cm long, muscular, tubular and ciliated structure. It lies in pelvic region, just above the urinary bladder. It is composed of outer serosa, middle muscularis and inner mucosa. mucosa is made up of simple ciliated columnar cells and secretory cells which provides protection and nourishment to the ovum. Each fallopian tube is divided into infundibulum, ampulla, isthmus, and uterine part.

1148. In mammals, the brain centre, which regulates body temperature, is situated in

(a) cerebellum (b) cerebral lobe
(c) hypothalamus (d) medulla oblongata

UP CPMT-2001

Ans. (c) : The hypothalamus is a small but vital region located at the base of the brain, just above the brainstem and below the thalamus.

- The hypothalamus helps manage our body temperature, hunger and thirst mood sex drive blood pressure and sleep.

It also maintains our body's internal balance that is known as homeostasis.

1149. Sub class Prototheria is related with egg laying mammal such as:

(a) Kangaroo (b) Echidna
(c) Primate (d) None

Manipal-2000

Ans. (b) : Sub class prototheria is related with egg laying mammal such as echidna.

1150. Which one of the following animals lay eggs yet the female secretes milk?

(a) Bat (b) Kangaroo
(c) Platypus (d) Ostrich

CG PMT-2009
MGIMS Wardha-2009

Ans. (c) : The platypus is a mammal that lays eggs, which is unusual for mammals. However, like other mammals, female platypuses secrete milk to nourish their offspring, even though they do not give birth to live young. This combination of egg-laying and milk secretion sets them apart from most other mammals.

1151. Diaphragm is found in

(a) crocodile (b) kangaroo
(c) ostrich (d) snake

Manipal-2013

Ans. (b) : Diaphragm is found in kangaroo. The diaphragm placed beneath the lungs is a respiratory muscles that aids in the breathing process. It is a big dome-shaped muscle in the body that acts as the primary respiratory muscle.

- The diaphragm is the only organ that all mammals have and without it no mammals can live.

1152. Haversian system is diagnostic feature of

(a) avian bones (b) reptilian bones
(c) mammalian bones (d) bone of all animals

AMU-2008

Ans. (c) : Haversian system is diagnostic feature of mammalian bones. The haversian system is the cylindrical column like structure in compact bones. It is also known as osteon which is a series of concentric circles called Lamillae found in compact bones of mammals, Down the middle of each of these systems is a hollow tube that hold a blood vessel.

- Each Haversian canal generally contains one or two capillaries and many nerve fibres.

1153. Ancestors of mammals belong to

(a) Therapsida (b) Ornithischia
(c) Silusoidea (d) Chelonea

AMU-2008

Ans. (a) : Ancestors of mammals belong to therapsida. Therapsid are order of synapsids (class synapsida) that are believed to include mammals and their immediate evolutionary ancestors other than the mammals. All lineages of the therapsids are extinct with the last known non-mammalian theropsids dying out in early cretaceous period.

- Synapsids include all mammals.
- Therapsids include mammal, like reptiles, from which mammals evolved.
- Dinosaurs are reptiles, whereas dinosaurs are a therapsid and as such more closely related to mammals.
- Therapsid, initiated the eventual transition to the mammals.

@apna_pdf

1154. Besides bats, echolocation also occurs in
(a) primates
(b) wild cat
(c) whales and dolphins
(d) beavers

AMU-2008

Ans. (c) : Echolocation occurs when an animal emits a sound wave that bounces off an object, returning an echo that provides information about the object's distance and size.
• Wales and Dolphins have echolocation system which involves the generation of ultrasonic sound which in turn produces echoes which are then reflected back by any obstacles in their path. This helps them in locomotion and catching their prey even with poor visibility.

1155. The bone of a mammal contains Haversian canals which are connected by transverse canals called as:
(a) Bidder's canal (b) Semicircular canals
(c) Volkmann's canal (d) Eustachian canal

Haryana PMT-1999

Ans. (c) : Haverspian canal is the bone of mammals are connected by small blood vessel canal called Volkmann's canal.
Volkmann's canal also knows as perforating canal. These are small channels found in bone tissue that run perpependicular to the central haversian canals. Volkamann's canals play crucial role in allowing blood vessels and nerves to penetrate deep into bone tissue providing nourishment and communication to osteocytes. within the bone matrix.

1156. Suckling the young by both male and female parents is observed in:
(a) Pangolin (b) Macropus
(c) Loris (d) Ornithorhynchus

AP EAMCET-2001

Ans. (d) : Suckling the young by both male and female parent is observed in ornithorhynchus (duck-billed platypus). Platypus lays eggs in nests. The beak or bill is broad and flat just like a duck. Hence named as duck-billed platypus, pinnae are absent. Both the webbed feet and flattened tail help in swimming. Mammary glands are present but nipples or teats are absent.
• Platypus has some characters common with reptiles, egg laying habit, reptilian type of excretory system it is a connecting link between reptiles and mammals.

1157. Mammary glands are modified
(a) sweat glands (b) ceruminous glands
(c) glands of Zeis (d) inguinal glands

AMU-2005

Ans. (a) : Mammary glands are modified sweat glands. Functionally, they are produce milk. These glands are located in the breast overlying the pectoralis major muscles. These glands are present in both male and females. Mammary glands function regulated by hormones.
Ceruminous gland in the skin of the humans external auditory canal are modified apocrine gland.

1158. Which of the following is an exclusive character of class mammalia ?
(a) Homoiothermy
(b) Internal fertilization
(c) Presence of a 4-chambered heart
(d) Presence of a muscular diaphragm

CMC Ludhiyana – 2012
Rajasthan PMT - 2010
AMU-2009

Ans. (d) : An exclusive characteristic of class mammalia is the presence of a muscular diaphragm. This structure separates the chest cavity from the abdominal cavity and plays a key role in breathing. While other options like homoeothermic (regulation of constant body temperature), internal fertilization, and a 4-chambered heart are important features of mammals, they are not exclusive to mammals and can be found in other animal class as well. Light crocodiales, (Reptiles).

1159. Flippers of seal are modified:
(a) fins (b) hind limb
(c) forelimb (d) gills

AFMC-2004

Ans. (c) : Flippers of seal are modified forelimb. Seal is a marine gregarious and carnivorous fish. The forelimb are modified into paddle for swimming adaptation.
• Flippers of seals have 5 digits which are webbed and have claws.
• Flippers of the seal are the modified form of forelimbs. These are the examples of Homologous organ.

1160. Jaws of shark contain
(a) thecodont teeth (b) acrodont teeth
(c) pleurodont teeth (d) None of these

AMU-2012

Ans. (b) : Cartilaginous fishes, like sharks and rays, have one set of oral Jaws made mainly of cartilage. The large sharks commonly sleep in worm waters. They were characterised by sharp sight and smelling power, great muscular strength, agility, strong Jaws with sharp acrodont teeth.
• Acrodont teeth are the weakest, and don't have a firm attachment inside the Jaw.

1161. Which one of the following characters is not typical of the class-Mammalia?
(a) Seven cervical vertebrae
(b) Thecodont dentition
(c) Ten pairs of cranial nerves
(d) Alveolar lungs

CG PMT-2006

Ans. (c) : Every mammals has 12 pairs of cranial nerves and not 10. Therefore, this option does not belong to class mammalia.
• In higher vertebrates there are 12 pairs of cranial nerves; olfactory, optic, oculomotor, trochlear, trigeminal, abducent, facial, vestibulocochlear, glossopharyngeal, vagus, accessory and hypoglossal.
• Cranial nerves are concerned with the head , neck and other facial regions of the body.

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1162. External ears are characteristics of

(a) mammals (b) reptiles
(c) amphibians (d) pisces

CG PMT-2006

Ans. (a) : External ears are a characteristic features of mammals.
- The external ear is also known as the pinna.
- The primary function of external ear is to perceive sound vibrations and subsequently focus it on the eardrum.
- The external ears might play a role in regulating body temperatures in these groups of animals.

1163. Identify the group, which includes animals all of which give birth to young ones directly?

(a) Dolphin, kangaroo, bat, cat
(b) Platypus, penguin, bat, hippopotamus
(c) Shrew, bat, kiwi, cat
(d) Lion, whale, ostrich, bat

Manipal-2009
Karnataka CET-2009

Ans. (a) : Animals that give birth to babies are called viviparous animal. Dolphin, kangaroo, Bat, Cat, Whale, Seals and others are mammals and thus give birth to live babies.
All mammals are viviparous except lower mammals as - duck billed platypus. Dolphin, kangaroo, bat, cat, shrew, lion, whole and hippopotamus are viviparous mammals.
All birds including flight and flight less birds are oviparous. eg. → Penguin, Ostrich, Kiwi.

1164. Eggs of egg laying (prototherians) mammals are :

(a) macrolecithal (b) telolecithal
(c) alecithal (d) mesolecithal

DUMET-2001

Ans. (a) : Eggs of egg laying (prototherians) mammals are macrolecithal. Enormous amount of yolk is present in macro lecithal eggs and here yolk is several times greater than cytoplasm. These eggs may be small or big.
- It is also called polylecithal egg.
- Telolecithal - An egg that has a large quantity of yolk where the yolk is inevenly distributed all through the cytoplasm. eg. Arthopoda.
- Mesolecithal - These are the eggs that have intermediate amount of yolk.
  eg. → fishes, amphibians
- Alecithal egg - This is one which has a negligible amount of yolk or no yolk e.g. human ovum.

1165. Lower jaw of mammals made up of

(a) one bone (b) two bones
(c) many bones (d) None of these

VMMC-2010

Ans. (a) : The lower Jaw of mammals consists of only one bone, the dentary where as jaws of other vertebrates are composed of more than one bone.
- This bone joint the skull at the squamosal bone.
- In mammals the lower Jaw is known as the mandible while the upper jaw is made up of the maxillary.

Other vertebrates like fish, reptiles and birds usually have complex multipart jaws.

1166. Which one is correctly matched?

	Animal	Characteristic	Taxon
(a)	Millipede	Ventral nerve cord	Diplopoda
(b)	Duck-billed platypus	Oviparous	Mammalia
(c)	Silverfish	No Pectoral and pelvic fins	Insect
(d)	Sea anemone	Diploplastic	Cnidaria

(a)

Animal	Characteristic	Taxon
Millipede	Ventral nerve cord	Arachnids

(b)

Animal	Characteristic	Taxon
Silver fish	Pecotral and pelvic fins	Chordata

(c)

Animal	Characteristic	Taxon
Duck – billed Platypus	Oviparous	Mammalia

(d)

Animal	Characteristic	Taxon
Sea anemone	Triploblastic	Cnidaria

BVP-2015
NEET (Karnataka)-2013
AP EAMCET-2011

Ans. (c) : Duckbill platypus is a small oviparous aquatic mammal which consists of a beak-like a duck and webbed forelimbs which help them in swimming.

	Animal	Characteristic	Taxon
(a)	Millipede	Ventral nerve cord	Diplopoda
(b)	Duck-billed platypus	Oviparous	Mammalia
(c)	Silverfish	No Pectoral and pelvic fins	Insect
(d)	Sea anemone	Diploplastic	Cnidaria

1167. Ancestors of mammals belongs to

(a) Therapsids (b) Ornithischia
(c) Silusidea (d) Chelonia

VMMC-2008

Ans. (a) : Therapsids are a genus of synapsids known to include mammals and their immediate evolutionary ancestry.
- Therapsida links to the ancestor of mammals, as there are numerous similarities found in both of them.
- Some of therapsida features are.

(i) Vertical limbs that stretch out of the body.
(ii) The large jaw and heterodont teeth.
(iii) The appearance of hair on the body.

1168. Which animals (mammals) contain more amount of yolk then cytoplasm in their eggs?

(a) Placenta mammals
(b) Aquatic mammals
(c) All eutherians
(d) Prototherians

BVP-2013

@apna_pdf

Ans. (d) : Animals (mammals) contain more amount of yolk then cytoplasm in their eggs prototherians?

- These monotremes have macrolecithal eggs which means the yolk content is several time more than the cytoplasmic substance. The egg may be small or big but having huge amount of yolks. For example- the eggs of reptiles, birds etc.
- Placental mammals have alecithal eggs that contain a very small amount of yolk.

1169. A group of animals having marsupium is

(a) Monotremata (b) Eutheria
(c) Metatheria (d) Pantotheria

Rajasthan PMT-2011

Ans. (c) : Metatheria mammals are also knowns as marsupials. These are non-placental mammals. The presence of pouch is the characteristic feature of marsupials. The pouch is fold of skin with only one opening ..

1170. Fertilization of ovum takes place in rabbit, man and other placental mammals in

(a) ovary (b) fallopian tube
(c) cervix (d) uterus

Rajasthan PMT-2009

Ans. (b) : Fallopian tubes are part of female reproductive system in mammals. They are called oviducts. In mammals fertilization takes place in fallopian tube. In Rabbit, man and other placental mammals fertilization occurs in ampula region of fallopian tube. The egg cell is transported from an ovary to a fallopian tube where it may be fertilized.

1171. Right systemic arch is absent in

(a) reptiles (b) birds
(c) mammals (d) none of these

AMU-1996

Ans. (c) : Right systemic arch is absent in mammals. Systemic arch originates from the systemic aorta that develops from left ventricle. The sixth arch becomes the pulmonary aorta that divides into two pulmonary arteries and each artery goes to each lung.
In bird systemic artery on right side while in mammal in left side.

1172. The example of oviparous mammal is

(a) Talpa (b) Erinaceous
(c) Macropus (d) Echidna

AMU-1996

Ans. (d) : Echidna is known as spiny anteaters. It is a monotremes (egg laying mammals) belonging to family Tachyglossidae.

- Echidna is an oviparous organism among the mammals i.e. it lays eggs and does not give birth to young ones it feeds its young ones with its milk.

1173. Salivation in mammals is under the control of

(a) medulla oblongata (b) mesencephalon
(c) hypothalamus (d) cerebellum

AMU-1996

Ans. (a) : Salivation in mammals is under the control of medulla oblongata. Nervous control of salivation. The superior and inferior salivary nuclei located in the pons and medulla directly control salivation.
Preganglionic Parasympathetic fibers from the superior salivary nucleus travel over the facial nerve.

- Preganglionic fibers from the inferior salivary nucleus travel to the otic ganglion and stimulate Parotid gland secretion.

1174. The egg found in monotremata is

(a) microlecithal
(b) Mesolecithal
(c) Macrolecithal
(d) None of these

HP CET-2012

Ans. (c) : Macrolecithal egg has a quantity of yolk is more than cytoplasm. Macrolecithal eggs are present in gymnophiona, teleost fishes, birds, amphibians, and monotremes (egg laying mammals like marsupials).

- Monotremes are endothermic with a high metabolic rate have hair on their bodies, produce milk through mammary glands to feed their young have singie bone in lower jaw.

1175. Which is not a fish?

(a) Scoliodon (b) Electric ray
(c) Whale (d) Sea horse

VMMC-2003

Ans. (c) : Whales is not a fish. It is fully aquatic mammal.

- Whales are warm blooded animal and breath air by lungs bear live young and nurse them with milk, Their adaptations for aquatic life include a thick layer of blubber. Which insulates them from cold and provide buoyancy.

1176. In ureotelic animals urea is formed by:

(a) Ornithine cycle (b) Caris cycle
(c) Krebs cycle (d) EMP pathway

VMMC-2003

Ans. (a) : The ureotelic animals urea is formed by ornithine cycle also known as urea cycle.

- In this biochemicel reaction urea (produces from ammonia ammonia is highly toxic but urea is less.
- Animals that use this cycle called ureotetic such as amphibian and mammals.
- Krebs cycle also known as citric acid cycle (CAC) this cycle use to organism generate energy.
- EMP pathway also known as glycolysis in this pathway glucose degradation occur

1177. Role of spleen in mammal is

(a) to control blood pressure
(b) to assist liver
(c) to act as haemopoietic tissue
(d) to assist kidneys

Rajasthan PMT-2009
CMC Vellore-2009

@apna_pdf

Ans. (c) : The spleen plays very important role in regard to red blood cells (erythrocytes) and the immune system. It is also act as haemopoietic.
- It removes old R.B.C and holds a reserve of blood.
- The spleen is found in all vertebrate.

1178. Oviparous mammals are :
(a) Kangaroo (b) duck billed platypus
(c) Whale (d) Rabbit

BCECE-2002

Ans. (b) : Oviparous animals are animals that lay their eggs, with little or no other embryonic development within the mother. example - birds.
Egg laying mammals are primitive mammals classified under sub-class prototheria. Example – ornithorynchus (duck billed platypus).
Mammals are mostly viviparous (give birth to young ones), but duck billed platypus is oviparous and belongs to mammalian category because it feed its young ones by its milk.
Kangaroo, whale and rabbit are viviparous mammals.

1179. In mammals, carbohydrates are stored as :
(a) glycogen in liver and spleen
(b) lactic acid in muscles
(c) glucose in liver
(d) glycogen in liver and muscles

BCECE-2003

Ans. (d) : Corbohydrates in mammals are primarily stored as glycogen, found in both the liver and muscles. This stored glycogen can be broken down into glucose when body needs energy.

1180. Hairless mammals are
(a) rodents (b) chiropterans
(c) primates (d) cetaceans

Haryana PMT-2011

Ans. (d) : Hairless mammals like cetaceans (dolphins and whales) have evolved to live in aquatic environment, which is why they have minimal hair or none at all. This adaptation helps them move more efficiently in the water and reduces drag.

1181. Zygomatic process in mammals arises from
(a) mandible (b) maxilla
(c) premaxilla (d) squamosal

AMU-2003

Ans. (d) : Zygomatic process in mammals arises from squamosal. The zygomatic process of the maxilla is a rough triangular shape which separate the anterior, zygomatic and orbital surface.
A long slender process of the temporal bone helping to form the zygomatic arch which protect the eye.

1182. In mammals, digestion of starch starts from
(a) mouth (b) stomach
(c) oesophagus (d) duodenum

AMU-2002

Ans. (a) : In mammals, the digestion of starch begins in the mouth. Salivary amylase, and starch into simpler sugars like maltose. This process initiates the digestion of carbohydrates before the food even reaches the stomach.

1183. Right lung of rabbit is divided into
(a) four lobes (b) two lobes
(c) six lobes (d) eight lobes

UP CPMT-2009
Punjab MET-2009

Ans. (a) : The right lung of rabbit is made up of 4 lobes and the left lung is made up of 2 lobes.

1184. The cavity in the region of diencephalon in the brain of rabbit is called
(a) lateral ventricle (b) third ventricle
(c) foramen of Monro (d) iter

AMU-2005

Ans. (b) : The cavity in the region of diencephalon in the brain of rabbit is called third ventricle. This is a fluid-filled cavity located in the region of the diencephalon in the brain of a rabbit. It plays a crucial role in the circulation and exchange of cerebrospinal fluid, helping to cushion and protect the brain.

1185. In which of the following eggs meroblastic cleavage occurs ?
(a) isolecithal (b) microlecithal
(c) centrolecithal (d) telolecithal

Rajasthan PMT-1998

Ans. (d) : Meroblastic cleavage occur in telolecithal egg meroblastic cleavage generally occur in fertilized eggs that contain a greater quantity of Yolk.
In meroblastic cleavage the cleavage furrow form but do not progress into the yolk.
Isolecithal eggs refer to the even distribution of yolk in the cytoplasm. It occurs in organism with very little yolk like mammals.

1186. Vivipary is found in:
(a) Coelenterata (b) Protozoa
(c) Rabbit (d) Pisces

Rajasthan PMT-2004

Ans. (c) : Vivipary is found in rabbit. It refers to the phenomenon where seeds or embryos develop inside the parent's body and are born alive.

1187. The dorsal diverticulum of urethra in male rabbit is
(a) uterus (b) uterus masculinus
(c) prepuse (d) vas deferens

VMMC-2010

Ans. (b) : The dorsal diverticulum of the urethra in a male rabbit is known as the "uterus masculinus" Despite its name, it does not serve the same purpose as a uterus in females. Instead, it is a small structure related to reproductive anatomy in rabbits.

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1188. Zygomatic arch of rabbit is formed of
(a) maxilla, periotic and jugal
(b) periotic, jugal, and palatine
(c) maxilla, squamosal and jugal
(d) maxilla, premaxilla and squarmosal

UP CPMT-2009
Rajasthan PMT-2009

Ans. (c) : The zygomatic arch of a rabbit is made up of the maxilla, squamosal, and jugal bones. These bones come together to create the body structure that extends from the side of the skull and plays a role in supporting the jaw and facilitating.

1189. Which of the following has discoidal placenta?
(a) Rabbit (b) Deer
(c) Sheep (d) Pig

BCECE-2007

Ans. (a) : A discoidal placenta is a type of placenta that is found in rabbits. It is named "discoidal" because it is shaped like a disc. This type of placental allows for efficient exchange of nutrients and waste between the mother rabbit and her developing embryos.

1190. Ruminants belong to order
(a) Proboscida (b) Artiodactyla
(c) Asthma (d) Cancer

JIPMER-2010

Ans. (b) : Ruminant, like cows, sheep, and deer belong to the order Artiodactyla. This group of mammals is characterized by having an even number of toes on each foot and a specialized stomach with four compartments for digesting plant material through a process called rumination.

1191. The number of lobes in left lung of rabbit is–
(a) two (b) three
(c) four (d) five

Uttarakhand PMT-2010

Ans. (a) : Lung of Rabbit:- The right lung of rabbit is made up of 4 lobes and the left lung is made up of 2 lobes.
• Rabbit lungs have nosepta, the right lung has four lobes and the left lung has three lobes air flow volume is higher in the left lung rabbits at rest respire mostly through the activity of the diaphragm.

1192. Valve of Thebesius is present in the heart of–
(a) fish (b) frog
(c) Chamaeleon (d) rabbit

Uttarakhand PMT-2010

Ans. (d) :: The valve of Thebesius is located in the heart of a rabbit. It is a small valve that helps prevent backflow of blood in the heart's coronary veins.

1193. Which is present in male rabbit but not present in female rabbit?
(a) Urethra (b) Vagina
(c) Uterus (d) Vas deferens

JCECE-2012

Ans. (d) : The vas deferens is present in male rabbit and is responsible for transporting sperm from the testes to the urethra. It is not present in female rabbits.

1194. Which one hormone of the pituitary of the Rabbit controls the protein metabolism and growth of skeleton?
(a) lodo thyroxine
(b) Leutotrophic hormone
(c) Somatotrophic hormone
(d) Oxytosine

Rajasthan PMT-2002

Ans. (c) : Somatotrophic hormone of the pituitary of the Rabbit controls the protein metabolism and growth of skeleton. Somatotropin also known as human growth hormone in its human form is a peptides hormone that stimulates growth, cell reproduction and cell regeneration in human and other animals. It is thus important in human development
• Somatotrophic hormone a Natural hormone of pituitary gland makes and releases that acts on many parts of the body to promote growth in children.

1195. Which gland is associated with fur hairs of Rabbit?
(a) Mucous gland (b) Sweat gland
(c) Mammary gland (d) Sebaceous gland

Rajasthan PMT-2002

Ans. (d) : Sebaceous gland is associated with fur hairs of Rabbit. This gland secrete sebum through the sebaceous duct.
• Sebaceous gland enlarges and become functionally active during puberty.

1196. Sertoli cells are associated with :
(a) kidney of Rabbit (b) ovary of Frog
(c) testis of Rabbit (d) ovary of Rabbit

Rajasthan PMT-1999

Ans. (c) : Sertoli cell are one of the most important cells necessary for sperm production in male. It is associated with the testis of rabbit.

1197. In rabbit, end of a long bone is connected in another by
(a) tendon (b) ligaments
(c) muscle (d) cartilage

UP CPMT-2012

Ans. (b) : In rabbit, end of a long bone is connected in another by a ligament. It is a fibrous connective tissue that attaches bone to bone. It also serve to hold structure together and keep them stable.
Tendon:- A tendon is a fibrous connective tissue that attaches muscle to bone.
Muscles are soft tissue present in most of the animals contain protein filament made out from myosin and actin.
Cartilages are soft and flexible in nature. They functions as a connective tissues that joints of 2 or more bones.

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1198. The branch of biology, which deals with the study of processes and functions of an organism, is called

(a) Histology (b) Anatomy
(c) Physiology (d) Entomology

BVP-2007

Ans. (c) : Physiology is branch of biology that aims to understand the mechanism of living thing from the basis of cell function at the ionic and molecular level of the integrated behaviour of the whole body and the influences of the external environment.

- Histology is branch of biology that studies the microscopic anatomy of biological tissue.
- Anatomy is the study of the internal structure of organism.
- Entomology is the study of insects.

1199. Which of the following vessel in rabbit start with capillaries and ends in capillaries?

(a) Pulmonary artery
(b) Renal vein
(c) Hepatic portal vein
(d) Renal artery

JCECE-2003
Rajasthan PMT-2002

Ans. (c) : Hepatic portal vein in rabbit start with capillaries and end in capillaries.

Renal vein carries the deoxygenated blood from the kidney to the inferior vena cava.

- Pulmonary artery carry deoxygenated blood from the right side of body to lungs.

1200. Which is the National Aquatic Animals of India

(a) Sea- horse
(b) Gangetic shark
(c) River dolphin
(d) Blue whale

NEET-2016 Phase-I

Ans. (c) : The National Aquatic Animal of India is Ganga Dolphin from 2010. Ganga River Dolphin is found only in the India subcontinent and has two species the Ganges river dolphin and the Indus river dolphin.

1201. What is true for mammalia:

(a) Platypus is oviparous
(b) Bats have feather
(c) Elephant is a ovoviviparous
(d) Diaphragm is absent in them

AIPMT-2000

Ans. (a) : Mammals are viviparous that means they give birth to offsprings. Primitive mammals called prototherians, like the Platypus ley eggs, so they are oviparous.

Bat is a mammal so they have no feather.

Elephant is viviparous animal.

Presence of diaphragm is unique feature of mammal.

1202. Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct

(a) It is present throughout life in Amphioxus
(b) It is present only in larval tail in Ascidians
(c) It is replaced by vertebral column in adult frog
(d) It is absent throughout life in humans from the very beginning

AIPMT (Mains)-2011

Ans. (d) : Human belongs to the phylum chordata, group vertebrata. These organisms are characterized by the presence of a notochord embryonic stage that changes into the backbone and skull.

1203. In which one of the following the genus name, its two characters and its class/phylum are correctly matched ?

	Genus name	Two characters		Class Phylum
(a)	Aurelia	(A)	Cnidoblasts	Coelenterata
		(B)	Organ level of Organization	
(b)	Ascaris	(A)	Body Segmented	Annelida
		(B)	Males and females distinct	
(c)	Salamander	(A)	A tympanum represents ear	Amphibia
		(B)	Fertilization is external	
(d)	Pteropus	(A)	Skin possesses hair	Mammalia
		(B)	Oviparous	

AIPMT (Screening)-2011

Ans. (c) : Salamander belongs to the phylum Amphibia having tympanum & fertilization are internal. Near about 90% species of salamander shows internal fertilization and few primitive possess external fertilization such as Asiatic salamander

1204. Which one of the following groups of animals is correctly matched with its one characteristic feature without even a single exception ?

(a) Mammalia : give birth to young ones
(b) Reptilia : possess 3-chambered heat with one incompletely divided ventricle
(c) Chordata : possess a mouth provided with an upper and a lower jaw
(d) Chondrichthyes : possess cartilaginous endoskeleton

AIPMT (Screening)-2011

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Ans. (d) : The pisces class includes cartilaginous fishes as a sub class known as chondrichthyes.
They are jawed vertebrates having scales, paired fins, paired nares, a heart with chambers arranged in series and a cartilage-based skeleton compared to a bone-based one. Sharks, rays are common example of this group.

1205. In mammals the secondary palate is formed by the union of
(a) premaxilla, pterygoid and squamosal bones
(b) maxilla, quadrate and palatine bones
(c) premaxilla, maxilla and palatine bones
(d) premaxilla, quadrate and squamosal bones

AP EAMCET-2008

Ans. (c) : In mammals the secondary palate is formed by the union of premaxilla, maxilla and palatine bone. The secondary palate of mammals, the bony palate that separate the nose from the mouth is formed by the in growth of two opposing shelves, one from the left and one from the right. The presence of secondary palate is related to mastication.

1206. The success of mammals on earth is largely because;
(a) They can conform to the changes in the environment.
(b) They can reduce metabolic activity and go into a state of dormancy during unfavorable conditions in the environment.
(c) They have the ability to maintain constant body temperature.
(d) They can take care of their young ones as they have mammary glands to suckle them.

Karnataka CET-2014

Ans. (c) : The success of mammals on earth is largely because they have the ability to maintain constant body temperature. Majority of animal and nearly all plants cannot maintain a constant internal body temperature. Their body temperature changes with the ambient temperature.

1207. Common among all mammals is:
(a) Ventral nerve cord
(b) Seven cervical vertebrae
(c) All are carnivores
(d) All are producers

AP EAMCET-2005

Ans. (b) : Presence of seven cervical vertebrae in the neck is common feature in a mammals. These vertebrae are acoelous covered by cartilaginous pads that called epiphysis.

1208. Identify from the following group of animals, which exhibit oestrous cycle.
(a) Lion, deer, dog and cow
(b) Cow, monkey, elephant and ape
(c) Monkey, ape, man and elephant
(d) Lion, dog, monkey and ape

Karnataka CET-2016

Ans. (a) : Oestrous cycle homologous to menstrual cycle occurs in non primates. It occurs only during breeding season of a species. It depending on the species and this cyclical breeding activity may continue for as long as six months in animals.

1209. Palaemon (prawn) is a:
(a) fish
(b) insect
(c) soft shell mollusk
(d) crustacean

J&K CET-2000

Ans. (d) : Prawn belong to crustacea class of mandibulata.
Palaemon is nocturnal & omnivorus.

1210. What are the locomatory organs in Echinoderms?
(a) Mantle
(b) Tube feet
(c) Ommatidia
(d) Pedicullariae

UP CPMT-2012

Ans. (b) : An echinoderms move by using many tube feed. Tube feet are the many small tubular projections found n the oral face of echinoderms arms. They are characteristic of the water vascular system of echinoderm phylum.

1211. Which of the following is entero coelomate invertebrate ?
(a) echinodermata
(b) arthropoda
(c) annelida
(d) mollusca

Punjab MET-2004

Ans. (a) : An animal develops from enterocoel is called as enterocoelomate.
e.g. : Echinodermata.

1212. Which of the following character is not found in all the chordates:
(a) Diaphragm
(b) Coelom
(c) Pharyngeal gill clifts
(d) Dorsal nerve cord

AIPMT-2000

Ans. (a) : Diaphram is solely found in mammals. It is a dome-shaped, muscular partition that separates the thoracic and abdominal cavities in mammals.

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05 MORPHOLOGY OF PLANTS

A. Root and Regions of Root

1. Quiescent centre is the zone of :
(a) least mitotic activity in the root apex
(b) least mitotic activity in the shoot apex
(c) maximum mitotic activity in the root apex
(d) maximum mitotic activity in the shoot apex

JIPMER-2006
WB JEE-2010 / VMMC-2007
MGIMS Wardha-2005
UP CPMT-2005

Ans. (a) : Quiescent centre is the zone of least mitotic activity in the root apex.
• The quiescent centre of roots consists of a rarely dividing pool of stem cells within the root apical meristem.

2. Identify the correct sequence of steps in the formation of root nodules in legumes
(a) Formation of infection thread
(b) Curling of root hair
(c) Stimulation of cell division in cortex and pericycle
(d) Release of sugars and aminoacids by legume roots
(e) Release of bacteria into cortical cells
(a) e, d, a, b, c (b) c, d, a, b, e
(c) b, d, a, c, e (d) d, b, a, e, c

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : When bacteria Rhizobium is grow on susceptible aria of root hair and the start divide.
Then the infection of root hairs causes the curling of root hair
Than Rhizobium bacteria go into innercortex and inner cortical and pericycle cells start to divided and the division of cortex and pericycle made a root nodules
Than the root nodules start to release of sugar and aminoacids by legume root.

3. Arrange the following in order of their occurrence (from top to bottom) in the regions of the root tip
I. Region of maturation
II. Region of elongation
III. Region of meristematic activity
IV. Root cap region
The correct sequence is
(a) I, III, II, IV (b) III, I, IV, II
(c) II, III, I, IV (d) I, II, III, IV

TS EAMCET-08.05.2019 Shift-I

Ans. (d) : Region of root from top to bottom are as follows-
I. Region of maturation
II. Region of elongation
III. Region of meristematic activity
IV. Root cap region

4. The types of roots present in mustard plant is
(a) Fibrous roots
(b) Adventitious roots
(c) Tap roots
(d) Nodulated roots

SRM JEEE-2018

Ans. (c) : Tap roots system is present in mustard plant. It is main root of a primary root system. It is growing vertically downward and gives off small lateral roots.
- Fibrous root system is opposite of a tap root system. It is usually formed by moderately branching roots growing from the stem.
- Adventitious roots include those formed on stem and leaf cutting and those produced by air layering. Nodulated roots are generally found on the roots of leguminous plants like beans, peas etc.

Nodules are symbiotic relationship between leguminous plants and N_2-fixing bacteria rhizobium.

5. Root hairs develop from the region of
(a) Maturation
(b) Elongation
(c) Root cap
(d) Meristematic activity

NEET-2017

Ans. (a) : Root has three prominent regions-
(i) Region of maturation.
(ii) Region of elongation.
(iii) Region of meristematic activity.
• Root hairs develop from the region of maturation. Certain epidermal cells from this region from fine and delicate, thread-like structure called **root hairs**. It helps in the absorption of water and minerals. Root hair are long tubular-shaped outgrowth from root epidermal cells.

6. Best material for the study of mitosis in laboratory is: -
(a) Anther (b) Root tip
(c) Leaf tip (d) Ovary

BVP-2011
AIPMT-2002

Ans. (b) : Root tip as compared to the leaf tip/anther/ovary is the best material to study of mitosis.
Root tip have active meristematic zone where cells divide mitotically leading increase in length of the root.
So, the root tips are the most commonly used for studying mitosis.
Example :- (*Allium cepa, Allium sativum*) Root tip.

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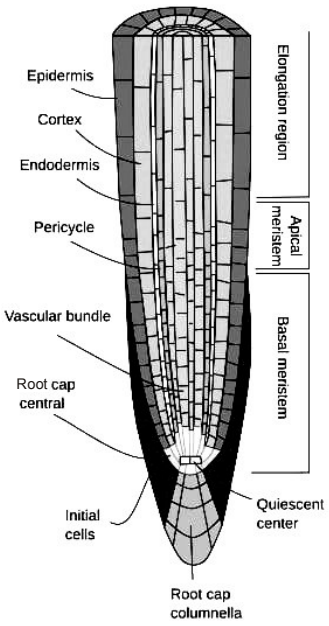


7. Quiescent centre theory was proposed by:
(a) Nageli (b) Schmidt
(c) Hanstein (d) Clowes

BVP-2005

Ans. (d) : Quiescent centre theory was proposed by a British biologist **Frederick Albert Lionel Clowes** (F.A.L. Clowes) in 1961 in Maize and observed an inactive center in between root cap and active meristematic region. The quiescent centre, play a crucial role in maintain the surrounding stem cells and promoting root growth.

8. Roots play insignificant role in absorption of water in
(a) Wheat (b) Sunflower
(c) Pistia (d) Pea

AIPMT (Re-Exam)-2015

Ans. (c) : Pistia is hydrophyte and in hydrophyte roots are poorly developed. Roots play insignificant role in absorption of water in pistia. Pistia, also known as water lettuce
• Hydrophytes are free floating plants float on surface. How ever roots are well developed in mesophyte and Xerophytes.

9. The cells of the quiescent centre are characterised by
(a) having dense cytoplasm and prominent nuclei
(b) having light cytoplasm and small nuclei
(c) dividing regularly to add to the corpus
(d) dividing regularly to add to tunica

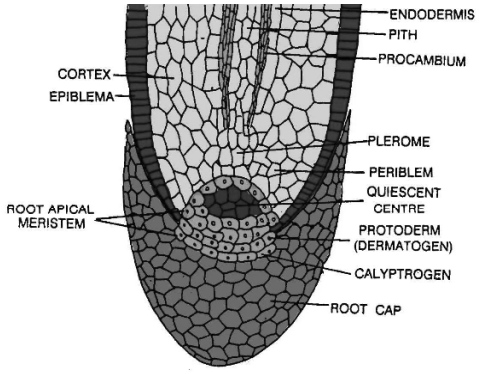
AIIMS-2008

Ans. (b) : Quiescent centre is a region in the apical meristem of a root where cells do not divided or the cell division proceeds at a very slow rate.
The cells with a quiescent centre have small dictyosomes, nuclei and nucleoli with little cytoplasm. These cells contain endoplasmic reticulum, mitochondria and contain low concentrations of RNA, DNA and protein.

10. The quiescent centre in root meristem serves as a:
(a) Site for storage of food which is utilized during maturation
(b) Reservoir of growth hormones
(c) Reserve for replenishment of damaged cells of the meristem
(d) Region for absorption of water.

Punjab MET- 2006
AIIMS-2003

Ans. (c) : A zone of inactive cells is present in the central part of the root apex is called **quiescent centre.** The cells of the quiescent centre have a lower concentration of the proteins, DNA and RNA and these are maintained at a lower mitotic activity.
• It is responsible for providing the cells to the root apical meristem during the injury or the heavy growth period.



QUIESCENT CENTER

11. Which of the following feature connot be considered to distinguish underground stem from a root ?
(a) Presence of nodes and internodes
(b) Presence of axillary and terminal buds
(c) Absence of scale leaves and adventitious roots arising from nodes
(d) Presence of exogenous branches

MGIMS Wardha-2015

Ans. (c) : Rhizomes are underground stems which grow beneath the surface of soil, they are frequently fleshy and serve as organs of food storage. Sometimes the rhizomes are condensed into solid swollen forms, which are known as corms. The tubers are also underground parts which may either be modified roots or stems.

12. What will be the correct sequence of four zone in a longitudinal section of root, starting from the tip upward?
(a) Root cap-Cell divsion – Cell maturation – Cell enlargement
(b) Root cap – Cell division –Cell enlargement – Cell maturation
(c) Cell division – Cell maturation – Cell enlargement – Root cap
(d) Cell division – Cell enlargement – Cell maturation – Root cap

Manipal-2014
Manipal-2007
AMU-2001

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Ans. (b) : Root cap → Cell division → Cell enlargement → Cell maturation.
(i) Root cap :- The root cap, a small tissue at the tip of the root protects the root from environmental stress and function in gravity perception.
(ii) Cell division :- An apical meristem lies behind the root cap and it produces the cells that give rise to the primary body of the plant.
(iii) Cell growth :- Cell growth is as fundamental for growth of organisms as is cell division implicit in cell growth is an increase in cell size.
(iv) Cell maturation :- The cellular developmental process, independent of morphogenetic change, that is required for a specific cell to attained fully functional state.

13. The casparian strips are present in cells of :
(a) Periderm (b) Epidermis
(c) Hypodermis (d) Endodermis
Manipal-2001

Ans. (d) : The casparian strips are present in cell of endodermis. Casparian strips are a cellular feature found in the roots of all higher plants. They are ring like, hydrophobic cell wall impregnations.

14. The lateral roots originate from
(a) exodermis (b) endodermis
(c) pericycle (d) vascular bundles
Rajasthan PMT-2003, 2006

Ans. (c) : The lateral roots originates from pericycle which becomes meristematic and undergoes periclinal and anticlinal division. These lateral roots extend outwords from the main root, providing additional anchorage and nutrient absorption for the plant.

15. In T.S. of root :
(a) metaxylem present inner side and protoxylem in outer side
(b) protoxylem present in inner side and metaxylem in outer side
(c) protoxylem remains absent
(d) protoxylem and metaxylem are not present on same radius
Rajasthan PMT-2001

Ans. (a) : In T.S of root metaxylem present inner side and protoxylem in outer side. Protoxylem is the first formed primary xylem that mature before the plant organs complete their elutriation while metaxylem is the later formed primary xylem that matures after the completion of the growth of the plant organs. Moreover, protoxylem has smaller cells. Whereas, metaxylem contains larger cells.

16. Root pressure is measured by :
(a) barometer (b) auxanometer
(c) manometer (d) photometer
Rajasthan PMT-2001

Ans. (c) : Root pressure is measured by manometer. A manometer is an instrument used to measure and indicate root pressure. The root pressure theory was first given by Priestley in the year 1916. Otto von Guericke discovered the manometer in the year 1661.

17. Chicory powder which is mixed with coffee powder is obtained from:
(a) Root (b) Leaf
(c) Stem (d) Seeds
VMMC-2014
BHU PMT (Screening)-2005

Ans. (a) : Chicory powder which is mixed with coffee powder is obtained from root. Root chicory (*Cichorium intybus var. Sativum*) has long been cultivated in Europe as a coffee substitute. The roots are baked, roasted, grind, and used as an additive especially in the Mediterranean rigion.

18. The stimulus for geotropism in roots is perceived by:
(a) root cap (b) quiescent centre
(c) root tip (d) None of these
BVP-2011

Ans. (a) : The stimulus for geotropism in root is perceived by root cap. The root cap is located at the tip of the root and protects the root apical meristem (RAM), a zone of dividing cell that produces all cells in the root.

19. Which will die first, if the phloem tissue is damaged ?
(a) Shoot (b) Leaves
(c) Roots (d) Apical meristem
BVP-2011

Ans. (c) : If the phloem tissue is damaged, the roots will likely die firs. Phloem is responsible for transporting nutrients and sugars from the leaves to other parts of the plant, including the roots. Without this nutrient supply, the roots may not be able to sustain themselves, leading to their death. The shoot and apical meristem may still receive some nutrients from stored reserves, but the roots survival is more dependent on the continuous flow of nutrients through the phloem.

20. Quiescent centre possesses
(a) Actively dividing cells
(b) Meristematic cells
(c) Passive cell
(d) Storage cells
CMC Vellore-2011

Ans. (b) : The quiescent center (QC) is known to maintain the root meristem, and thus ensure root growth.
Quiescent centre is a zone of mitotically inactive zone in the meristematic region of the roots, apical meristem.

21. Which of the following is a total root parasite?
(a) Cuscuta (b) Rafflesia
(c) Santalum (d) Monotropa
BVP-2009

Ans. (b) : Rafflesia is a total root parasite found in sea shores of Java and Sumatra and Shri Lanka. Species of Rafflesia are all thought to be holoparasites of Lianas of the genus *Tetrastigma*. It is also known as queen of parasite.

22. The apical meristem of the root is present
(a) only in adventitious roots
(b) in all the roots
(c) only in radicals
(d) only in tap roots
Rajasthan PMT-2007

Ans. (b) : The apical meristem of the root is present in all the roots. Apical meristems occur at growing shoot and root tips. Root apical meristems produce the root cap.

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23. The structures present in the roots to absorb water and minerals is
(a) epidermal extensions
(b) hypodermis
(c) endodermis
(d) epidermal appendages

JIPMER-2013

Ans. (a) : Root hairs are the lateral epidermal extensions or tubular outgrowths in the root of plant. Root hair help plants to absorb water from the soil. They contain large vacuole having cell sap. The cell sap has a greater concentration of salts as compare to surrounding soil water hence water drawn inside by the process of osmosis. Root hair are fine hair - like outgrowths of root epidermal cells which increase the surface area for the absorption of water and exchange of gases.

24. Pneumatophores are commonly found in:
(a) hydrophytes (b) xerophytes
(c) mesophytes (d) mangroves

BHU PMT-2002
UP CPMT-2006, 2005

Ans.(d) : There's breathing roots called pneumatophores that are part of halophytes, such as mangrove trees. because they thrive in the saline marshes, halophytes have breathing roots that stick out into the water and absorb oxygen.
Ex:- *Rhizophora*

25. The root system growing near the base of the radical in monocots is:
(a) haptera (b) anchoring roots
(c) clinging roots (d) seminal roots

Punjab MET-2003

Ans. (d) : The root system growing near the base of the radical in monocots is 'seminal roots. Seminal roots arise from base of radicle.

26. Quiescent centre is found in root apex and acts as
(a) permanent source of active initiates
(b) reservoir of resistant cells
(c) reservoir of passive cells to form new apex if root apex is damaged/killed
(d) all of the above

MGIMS Wardha-2007

Ans. (d) : The quiescent center of roots consist of a rarely dividing pool of stem cells within the roots apical meristem. It is act as a permanent source of active initiates and reservoir resistant cells. It also has reservoirs of passive cells to form a new apex if roots apex is damaged or killed.

27. Which of the following region of root is responsible for increase in length of root?
(a) Root cap region
(b) Meristematic region
(c) Region of elongation
(d) Mature region

MGIMS Wardha-2014

Ans. (c) : The region of elongation is responsible for the growth of the root in length. In the region of elongation, the cells increase in length, there by increasing the length of the roots.
Region of cell elongation occurs behind the cell division layer, cells are elongated with large central vacuole and dense protoplasm.

28. Maximum amount of growth in root occurs
(a) in the presence of light
(b) at its apex
(c) behind the apex
(d) in the presence of soil

Manipal-2011

Ans. (c) : Maximum growth in root occurs behind the apex. Apex portion of roots is made of protective tissue, root cap and the region of cell division is situated below the root cap. Maximum growth occurs in exponential phase of sigmoid curve. During this period, cells divide mitotically to increase length and girth of the plant.

29. Histogens capping root apical meristem is :
(a) dermatogen (b) calyptrogen
(c) periblem (d) plerome

AFMC -2011

Ans. (b) : According to histogen theory proposed by **Hastein** (1868) the apical meristem consists of three distinct zones of meristematic cells called histogens. Calyptrogen is a histogen layer found in the root apical meristem that forms the root caps.

30. Removal of apical (terminal) bud of a flowering plant (or pruning of a flowering plant) leads to
(a) formation of new apical buds.
(b) formation of adventitious roots on the cut side
(c) early flowering (or stopping of floral growth)
(d) promotion of lateral branches

AFMC-2007

Ans. (d) : Removal of apical bud of a flowering plant leads to the promotion of lateral branches. At the removal of apical bud, the lateral buds grow vigorously. It shows the apical bud suppresses the growth of lateral bud just below it, that is known as apical dominance. The lowered IAA concentration allows the lateral buds to grow the produce new shoots, which compete to become the lead growth.

31. Which one of the following is the specific xerophytic adaptation?
(a) Presence of spines
(b) Absence of stomata
(c) Presence of long tap root system
(d) Presence of stipular leaves

J&K CET-2014

Ans. (c) : Root system in xerophytic plant is well developed the root are branched, long and reach deep into the soil to absorb more water. So, the 'presence of long tap root system' is one of the specific xerophytic adaptation. Other common adaptation in xerophytes are small or compound leaves, spines, waxy cuticle and variety of stomata adaptation.

32. Find the incorrect statement.
(a) Root hairs are unicellular elongations
(b) Root hairs absorb water and minerals
(c) Trichomes are unicellular elongations
(d) None of the above

AMU-2010

Ans. (d) : According to the given options no one is a incorrect statement. Root hairs are unicellular elongations. Projected from epidermal cells and it absorb water and minerals, Trichomes are a unicellular or multicellular elongations. Trichomes are leaf hair which are derived from one or more epidermal cells present on leaf surface.

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33. Which of the following region lying between meristematic region and root cap?
(a) Elongation region (b) Stationary region
(c) Root hair region (d) Quiescent centre
Manipal-2015

Ans. (d) : The quiescent centre is the region lying between the meristematic region and root cap. It is an inactive cell region present behind the root cap. They are wed to replace the meristematic cells of the root cap. In this region cell division proceeds very slowly or not at all but cells are capable of resuming meristematic acitivity.

34. Fibrous roots develop in maize from :
(a) upper internodes (b) upper nodes
(c) lower nodes (d) lower internodes
Haryana PMT-2011
JIPMER-2000

Ans. (c) : Maize is classified as a grass having a fibrous root system, rather than a tap root. This type of root system is found in most of the monocots. In maize, the fibrous roots is a nodal root system where the roots originate at one of the lower stem nodes of the plants. In fibrous root system, the primary root is short lived and replaced by a large number of roots
Ex:- Wheat, maize, rice.

35. Coralloid root is the feature of:
(a) Cycas (b) Mosses
(c) Pinus (d) Selaginella
BHU PMT (Mains)-2008
AMU-2002

Ans. (a) : Coralloid roots are specialized roots that are present in cycas. These roots are associated with nitrogen - fixing cyanobacteria. Cycas have small specialized roots associated with nitrogen - fixing cyanobacteria present at cortex region as Anabaena. These specialized roots are called coralloid roots.

36. Cuticle is absent in:
(a) mesophytes (b) young roots
(c) mature stems (d) leaves
DUMET-2009

Ans. (b) : Cuticle is absent in the young roots, It is a waxy layer that is farmed above the epidermis of the stem and leaves. This layer checks the loss of water from the plants. It is a waxy cuticle present on roots, it prevents absorption of water and salts from the soil, It is absent in the young roots to facilitate the entry of water into the roots.

37. A fibrous root system is excellent for:
(a) food storage
(b) nitrogen fixation
(c) absorbing water from deeper layer of soil
(d) providing good anchorage for the plant
DUMET-2009
AMU-2001

Ans. (d) : A fibrous roots system is excellent for providing good anchorage for the plant. These roots are highly branched roots and have more root hairs as well as more surface area than a tap root system. The fibrous roots of the plant are diversified into different direction increasing the surface area for anchorage.
Ex:- Wheat, maize, rice

38. If a primary root continues to grow, the type of root system will be known as:
(a) secondary (b) fibrous
(c) tap (d) stilt
DUMET-2009

Ans. (c) : If a primary root continues to grow, then the type of root system will be known as tap root, A tap root is a prominent and core root from which lateral roots emerge. **Ex:-** as in mustard

39. In which of the following are inulin crystals found?
(a) Wheat root (b) Mango root
(c) Dahlia root (d) Sugarcane root
Haryana PMT-2011

Ans. (c) : Inulin is a natural storage carbohydrate present in more than 36, 000 species of plants including wheat, onion, and garlic. It is a polysaccharide that is found in the roots and rhizomes of plants as a storage material. It is present mainly in the roots and tuber. In Dahlia roots, the inulin depositions appear fan like crystals.

40. Root cap is absent in
(a) mesophytes (b) hydrophytes
(c) xerophytes (d) lithophytes
HP CET-2013
Haryana PMT-2011
JCECE-2010

Ans. (b) : Root cap is absent in 'Hydrophytes', In hydrophytes roots are not present or not developed properly because they have abundant water in the surrounding environment so don't need to put extra effort to obtain them. It only the root cap is replaced by the root pockets and poorly developed root hairs are present. *Pistia* is a hydrophytes where root pockets are present.

41. In which of these plants are all roots?
(a) Wolffia (b) Podostemon
(c) Lemna (d) Utricularia
Haryana PMT-2011
MGIMS Wardha-2011

Ans. (b) : Podostemon is a hydrophytes in which the main plant body is root. It is an aquatic plant with thread-like roots that attaches the rocks. They have a pleiotropic, dorsiventral root system.

42. Which part of root absorbs both water and minerals ?
(a) Zone of cell differentiation
(b) Zone of cell formation
(c) Zone of cell elongation
(d) Terminal portion of roots
AMU-2003

Ans. (a) : Zone of cell differentiation, also known as the zone of maturation. Zone of cell differentiation part of root which absorbs both water and minerals because in this region root hairs are present.

43. Hygroscopic roots are found in
(a) Bryophyllum (b) Vanda
(c) Rhizophora (d) All of these
AMU-2002

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Ans. (b) : Hygroscopic roots are a type roots which absorb water from the atmosphere. Hygroscopic roots occur in Vanda because it is an epiphyte which absorbs moisture from the atmosphere as its source of water. Epiphytic species of Vanda possess very large and modified aerial root systems. These aerial root system are used for food consumption and water absorption.

44. In a woody dicotyledonous tree, which of the following parts will mainly consist of primary tissues?
(a) Stem and root
(b) All parts
(c) Shoot tips and root tips
(d) Flowers, fruits and leaves

JIPMER-2007

Ans. (d) : Primary tissues are the first tissues that develop during the growth of a plant and are responsible for the primary growth of the plant. These tissues are derived from the apical meristems, which are located at the tips of the shoots and roots. The remaining tissues are called secondary tissues. A dicot stem and root undergo secondary growth and hence have some secondary tissues. Branches of a dicot tree also show secondary growth. Flowers, fruits and leaves are all made of primary tissues.

45. Which one of the following pairs is wrongly matched while the remaining three are correct
(a) Agave – Bulbils
(b) Penicillium - Conidia
(c) Water hyacinth - Runner
(d) Bryophyllum – Leaf buds

AIPMT (Mains)-2011

Ans. (c) : Water hyacinth is a free-floating perennial plant. The dark green leave blades are circular and are attached to the petiole. They have a thick and branched fibrous root system and modified stem called as offsets. They grow horizontally outward and downward from plants and they show vegetative propagation.

- *Bryophyllum* produces vegetative buds on leaves.
- Agave has bulbils on their flower stalks.
- *Penicillium* produced asexually through conidia and due to presence of chain of conidia, *Penicillium* also called as painter's brush.

46. Which one of the following conditions in seen in the roots of a plant having submerged assimilatory roots and spongy petioles?
(a) Triarch (b) Monarch
(c) Tetrarch (d) Diarch

AP EAMCET-2008

Ans. (b) : Monarch is a condition found in roots of a plant having assimilatory submerged roots and spongy petiole and stele with one xylem
Ex:- *Trapa natans.*
Tetrarch- The stele with 4 xylem strands.
Ex:- *Gossypium*.
Triarch- The stele with 3 xylem strands.
Ex:- *Pisum*.
Diarch- Stele with two xylem strand. **Ex:-** *Nicotiana*.

B. Modification of Root

47. Sucking root are present in :
(a) Tubisoire (b) Betel
(c) Cuscuta (d) Orchids

Manipal-2010
AMU-2009
Punjab MET-1999
AFMC-2000

Ans. (c) : Sucking roots are seen in Cuscuta plant. Sucking roots, also known as Haustoria roots, are joint in parasitic plants Cuscuta is a complete stem parasitic plant, it gets its water and nutrients needed from the host. They can not carry out photosynthesis, because they lacks chlorophyll. The mode of nutrition in Cuscuta is heterotrophic.

48. Pneumatophores are positively:
(a) geotropic (b) phototropic
(c) aerotropic (d) rheotropic

HP CET-2011
VMMC-2005
AMU-2004
BVP-2003

Ans. (c) : Pneumatophores are positively 'aerotropic'. These roots are another name for 'Breathing roots'. They are positively aerotropic, negatively geotropic and negatively hydrotropic. Because they grow vertically upward and have breathing pore called pneumatophores. They are connected with internal parenchymatous tissues i.e; Aerotropic.

49. In which pneumatophores are found ?
(a) Tinospora (b) Pinus
(c) Rhizophora (d) None of these

Haryana PMT-2004
Manipal-2003
JIPMER-2003
Rajasthan PMT-2000,2001

Ans. (c) : Pneumatophores are found in 'Rhizophora'. These are specialized erect roots that are present above the ground. It is also called breathing roots. They are present in Rhizophora and mangrove trees. In Rhizophora, pneumatophores roots are found which is helpful to get oxygen for respiration from atmosphere.

50. Which of the following statement is not correct?
(a) Rhizome is a condensed form of stem
(b) The apical bud in rhizome always remains above the ground
(c) The rhizome is aerial with no distinct nodes and internodes
(d) The rhizome is thick, prostrate and branched

NEET (Re-Exam)-04.09.2022

Ans. (c) : These are non-green with distinct nodes and internodes. There are axillary as well as apical buds. These are brownish in colour. The common types of rhizomes are fleshy due to the storage of food material. It also contains terminal buds.
E.g.:- Ginger

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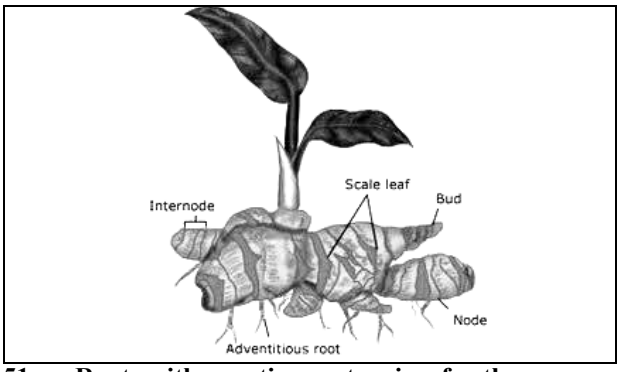


51. Roots with negative geotropism for the purpose of oxygen is found in the following:
(a) Pillar roots (b) Stilt roots
(c) Pneumatophores (d) Velamen roots

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Pneumatophores are specialized root structures that grow out from the water surface and facilitate the aeration necessary for root respiration in hydrophytic trees.
Pneumatophores are the specialized erect roots (a modification of root) which facilitate the exchange of gases in plants growing in marshy areas.

52. Identify the formation of the prop roots, stilt roots and pneumatophores respectively.
(A) Vertically growing upwards
(B) Roots coming out of the lower nodes of the stem
(C) Roots developing into vascular tissue of the host
(D) Hanging roots from the branches
(E) Roots that help in absorption of moisture
Options:
(a) A, B, C (b) B, C, D
(c) D, B, A (d) D, B, E

TS EAMCET-09.08.2021 Shift-I

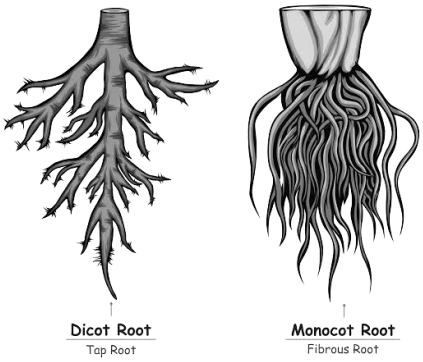
Ans. (c) : The formation of the prop roots, stilt roots and pneumatophores respectively-
Hanging roots from the branches, roots coming out of the lower nodes of the stem, vertically growing upwards.
• Prop roots and stilt roots and aerial roots occurs on the ground. These supporting roots are termed stilt roots.

53. The roots that originate from the base of the stem are:
(a) Primary roots (b) Prop roots
(c) Lateral roots (d) Fibrous roots

NEET-2020 Phase-I

Ans. (d) :
- Fibrous roots originate from the base of the stem. It is seen in the monocots. For eg. Wheat, Rice etc.

They perform functions like absorbing water and minerals from the soil and also provide support to the plant.
- Primary root originates at the germination stage from the radicle of the seed.
- Prop root is a modification of adventitious roots. Usually Adventitious roots develop from the stem and leaves. The prop root provides additional support to the plants because they have very strong roots. E.g- Banyan tree, Mangroves etc.



54. In *Ipomoea batatas* the food is stored in____
(a) Stem tuber (b) Leaves
(c) Buds (d) Tuberous root

MHT CET-2019

Ans. (d) : In *Ipomoea batatas* the food is stored in tuberous root. A tuberous root or storage root is a modified lateral root enlarged to function as a storage organ.

55. General function of the root system is absorption and conduction of water and minerals besides anchoring. But in this case the roots are fibrous and become swollen due to storage of food. Indicate the plant:
(a) Potato (b) Carrot
(c) Taeniophyllum (d) Asparagus

TS EAMCET-08.05.2019 Shift-II

Ans. (d) : General function of the root system is absorption and conduction of water and minerals beside anchoring but in this case the roots are fibrous and become swollen due to storage of food, indicate Asparagus plant.

56. Assertion (A): Tap roots of sweet potato become swollen to perform functions other than absorption and conduction of water
Reason (R) : Roots in some plants are modified for storage of food.
The correct answer is:
(a) Both (A) and (R) are true (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) Is true but (R) is false
(d) (A) Is false but (R) is true

TS EAMCET-09.05.2019 Shift-I

Ans. (d) : Root modifications are the permanent change in the structure which are caused so that the plant can be able to withstand and adjust to the environment.
Storage roots, such as carrots beets and sweet potatoes are examples of roots that are specially modified for storage of starch and water they usually grow underground as protection from plant eating animals.

57. Match the following

	Column-I		Column-II
(i)	Tap root	(A)	Sweet potato
(ii)	Adventitious root	(B)	Turnip
(iii)	Stem	(C)	Wheat
(iv)	Fibrous root	(D)	Potato

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(a) (i) – A, (ii) – B, (iii) – C, (iv) – D
(b) (i) – B, (ii) – C, (iii) – A, (iv) – D
(c) (i) – B, (ii) – A, (iii) – D, (iv) – C
(d) (i) – D, (ii) – C, (iii) – B, (iv) – A

AIIMS-26.05.2019 Shift-II

Ans. (c) :

(i) Taproot	(B) Turnip
(ii) Adventitious root	(A) Sweet potato
(iii) Stem	(D) Potato
(iv) Fibrous root	(C) Wheat

•**Taproot-** When roots are arises from radical is called **Tap root**.

• **Adventitious root-** The roots arise from parts of the plant other than the radical and are called **adventitious roots**. **For examples:-** Sweet potato.

• **Stem-** Each eye represents a node, bearing one or more buds subtended by a leaf scar (scale leaf). For example: Potato.

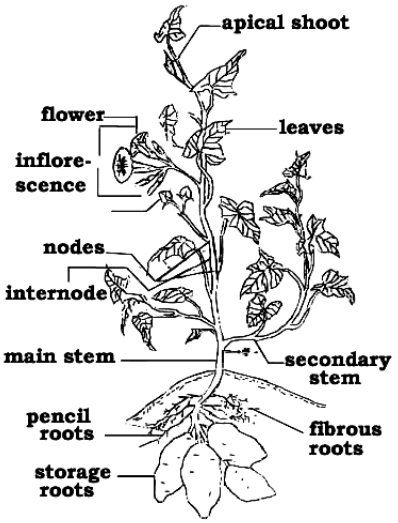
• **Fibrous root-** It is usually formed by thin, moderately branching roots growing from the stem. **For example:-** Grass, wheat, rice, marigold, white clover, maize, banana, millet, bamboo and onion.

58. Sweet potato is a modified:
(a) Stem
(b) Adventitious root
(c) Rhizome
(d) Tap root

NEET-2018
BVP-2002

Ans. (b) : Sweet potato is a modified adventitious root, meant for the storage of food.

- They are swollen part contain high amount of starch. e.g. of modified adventitious roots include Cassava, Dahlia.



59. Indicate the statement which is not correct?
(a) Stem tuber of potato, rhizome of Zingiber and corm of Colocasia help in perennation to tide over unfavourable conditions for growth
(b) Roots of Taeniophyllum and Avicennia called pneumatophores, help to get oxygen for respiration
(c) The haustorial roots of Striga and Cuscuta help to optain water and minerals from the host plant
(d) Rhizobium inhabit the root system to fix almospheric nitrogen by forming nodules, nodular roots in Pisum, Cajanus, Cassia etc.

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Pneumatophores are specialized aerial roots found in plants like mangroves (Avicennia) that help with gas exchange, specifically taking in oxygen for respiration. However, Taeniophyllum is a leafless epiphytic orchid that does not have roots for oxygen uptake, it relies on its host plant for nutrients and water.

60. Pneumatophores occur in
(a) Halophytes
(b) Free-floating hydrophytes
(c) Submerged hydrophytes
(d) Carnivorous plants

NEET-2018

Ans. (a) : Pneumatophores is characteristics of halophyte, it is breathing roots found in mostly halophyte e.g. mangroves.

- Pneumatophore are a type of aerial root grow above the ground and absorb water directly from the air

61. Indicate the statement which is not correct?
(a) Stem tuber of potato, rhizome of Zinziber and corm of Colacasia help in perennation to tide over unfavorable conditions for growth.
(b) Roots of Taeniophyllum and Avicennia called pneumatophores, help to get oxygen for respiration
(c) The haustorial roots of Striga and Cuscuta help to obtain water and minerals from the host plant
(d) Rhizobium inhabit the root system to fix atmospheric nitrogen by forming nodules, nodular root in Pisum, Cajanus, Cassia, etc

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Roots *Taeniophyllum* and *Avicennia* called preumatophores, help to get oxygen for respiration is incorrect statement because pneumatophores, commonly found in mangrove species that grow in brackish soil plants have lateral roots that grow upward to act as sites of oxygen intake for the submerged primary root system.

62. Roots of the following hydrophytes are fixed to substratum, but their long petiolated leaves keep them floating on water surface
(i) Salvinia
(ii) Victoria regia
(iii) Utricularia
(iv) Nymphaea
The correct combination is
(a) i & ii (b) ii & iii
(c) iii & i (d) ii & iv

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : Hydrophytes are aquatic plants that grow only in water.
Free floating hydrophytes are the plants that remain floating on the surface of water but in some species the roots remain embedded in the mud and only some parts on the plant like flowers and leaves float on water.
e.g:- *Victoria regia* , *Nymphaea, Salvinia* etc.

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63. Some plants like Viscum and Striga send roots into the xylem of the host plant to get water and minerals. Such roots are called as
(a) Velamen roots (b) Nodular roots
(c) Stilt roots (d) Haustorial roots

TS EAMCET-12.05.2017

Ans. (d) : Some plants like Viscum and Striga send roots into the xylem of the host plant to get water and minerals. Such roots are called as haustorial roots.

64. Coralloid roots in Cycas are inhabited by
(a) Anabaena (b) Fungi
(c) Trititcum (d) Lemna

UP CPMT-2013

Ans. (a) : Coralloid roots in Cycas are inhabited by *Anabaena*. The coralloid roots contain symbiotic cyanobacteria (blue-green algae), which fix nitrogen and in association with root tissues, produce such beneficial amino acids as a Asparagine and citrulline.

65. The lpomoea batatas (sweet potato) is:
(a) underground root
(b) underground stem
(c) modified leaf
(d) modified phylloclade

J&K CET-2002

Ans. (a) : The lpomoea batatas (Sweet potato) is underground root. The sweet potato (*Ipomoea batatas*) is a dicotyledonous plant that belongs to the bindweed or morning glory family, convolvulaceae. Its large starchy, sweet tasting tuberous roots are used as a root vegetable.

66. Roots which develop from any part of plants except radical are called?
(a) Top root
(b) Advantitious roots
(c) Pneumatophores
(d) Coralloid root

BVP-2001

Ans. (b) : Roots develop from any part of plants except radical are called Adventitious root. Adventitious roots, arising from the stem of the plants, are the main component of the mature root system of many plants. Their development can also be induced in response to adverse environmental conditions or stresses.

67. The floating roots are found in:
(a) Viscum (b) Vanda
(c) Tinospora (d) Jussiaea

BVP-2001

Ans. (d) : The floating root are found in *Jussiaea*. Free floating macrophytes are found suspended on water surface with thcir root not attached to the substrate, sediment, or bottom of the water body. They are easily blown by air and provide breeding ground for mosquitoes. Example includes *Pistia* spp. commonly called water lettuce, Water cabbage or Nile cabbage.

68. Velamen is present in:
(a) parasitic roots (b) assimilatory roots
(c) epiphytic roots (d) fusiform roots

AIIMS-1998

Ans. (c) : Epiphytic roots are adventitious roots found in epiphytes. Velamen is present in epiphytic roots. An epiphyte is an organism that grows on the surface of plant for getting shelter and derives its moisture and nutrients from the air, rain, water (in marine environments) or from debries accumulating around it.

69. Velamen present in orchids help in ?
(a) Absorbing water from support
(b) Respiration
(c) Absorption of moisture from air
(d) Synthesising food

AIIMS-2007

Ans. (c) : Orchids are the epiphytes that possess aerial roots. These aerial roots contain a spongy tissue called velamen.
- Velamen tissue is a non-living, multi-layered epidermal cells.
- These roots hang freely in the air and absorb the moisture from the air by a special type of tissue called as velamen.

70. Which of the following is correctly matched?
(a) Monstera –Fibrous root
(b) Dahlia –Fasciculated root
(c) Azadirachta – Adventitious root
(d) Basil – Crop roots

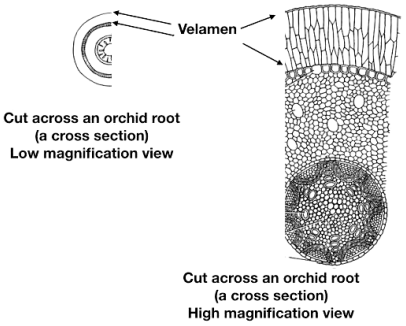
AIIMS-2012

Ans. (b) : Fasciculated roots are found in **Dahlia** and **Asparagus**. It's arising from the stem base in clusters.
- **Monstera-** The central root of Monstera is short-lived. Many roots form after it dries, forming a fibrous root structure.
- **Azadirachta-** (Neem) has tap root system. Some other. **Exa-** Carrot, Radish etc.
- **Basil plants-** The basil plants grow from thick tap-root system.

71. Velamen is a specialized tissue found in
(a) Aerial roots of Orchids
(b) Succulent leaves
(c) Pneumatophores
(d) Stilt roots.

AIIMS-2001
Manipal-2002
BVP-2000

Ans. (a) : Velamen is a multi-layered tissue that is spongy in nature which covers the aerial roots of epiphytic plants such as orchids. It helps in the absorption of water.



72. Radish is a modified root and an example of :
(a) napiform root (b) fusiform root
(c) conical root (d) tuberous root

J&K CET-2005

Ans. (b) : Radish is a modified root and an example of fusiform root. These modified roots usually are swollen and assume different form such as spindle shaped.
e.g :- Beet, turnip, radish (top shaped).

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73. In which the pneumatophores are found?
(a) Tinospora (b) Pinus
(c) Rhizophora (d) None of these
DUMET-2003

Ans. (c) : Pneumatophores are present in halophytes. eg. Rhizophora. It is the genus of mangroves that grow in salt water and lakes.

74. Which one is not a product of root?
(a) Sugarbeet (b) Radish
(c) Carrot (d) Potato
MP PMT-2013

Ans. (d) : Potato is not a product of root because it is a modification of underground stem called stolons where food is stored and becomes tuberous.

75. Stilt roots are found in:
(a) Rhizophora (b) maize
(c) banyan (d) colocasia
AMU-2014

Ans. (b) : Stilt root are found in maize. A true root that arises from the lower trunk and runs obliquely to the ground providing additional support for the tree. Stilt roots are adventitious root.
eg.:- Sugar cane, mangrove.

76. In sugarcane, the adventitious roots are called:
(a) prop roots
(b) prop and tuberous roots
(c) pneumatophores
(d) None of the above
Punjab MET-2011

Ans. (d) : In sugarcane the adventitious root are called stilt roots. The roots which develop from the basal nodes of the main stem are known as stilt roots.
Stilt roots are found in both Maize and sugarcane plant and it is also found in bamboo and pine.

77. Velamen and spongy tissue is found in:
(a) breathing roots (b) parasitic roots
(c) tuberous roots (d) epiphytic roots
Rajasthan PMT-2002

Ans. (d) : Velamen and spongy tissue is found in epiphytic root. An epiphyte is on organism that grow on the surface of a plant and derives of moisture and nutrients from the air, rain, water (in marine environments). eg. Orchid

78. Which of the following plants has haustorial roots?
(a) Pea (b) Trapa
(c) Lily (d) Cuscuta
J&K CET-2003

Ans. (d) : Cuscuta plants has haustorial roots. A specialized modified root of parasitic plant that penetrates into a host plant and functions to acquire necessory nutrients from the host plant.

79. Parasitic phanerogams absorb water and solutes from the host plant by:
(a) mycorrhizal roots (b) clinging roots
(c) haustoria (d) adventitious roots
J&K CET-2010

Ans. (c) : Haustoria highly modified stem or root of a parasitic plant or a specialized branch or tube originating from a hair like filament (hyphae) of a fungus. The haustorium penetrates the tissues of a host and absorbs nutrients and water.

80. Respiratory roots (pneumatophores) are present in:
(a) mesophytes (b) halophytes
(c) xerophytes (d) None of these
MGIMS Wardha-2012

Ans. (b) : Respiratory roots (pneumatophores) are present in halophytes. Pneumatophores commonly found in mangrove species that grow in saline, mud. Flats are lateral roots grow upward out of the mud and water to function as the site of oxygen take for the submerged primary root system.

81. Buttress roots are found in:
(a) Pandanus (b) Terminalia
(c) Banyan (d) Sorghum
Haryana PMT-2000

Ans. (b) : Buttress roots are found in Terminalia. Buttress roots are developed by many trees. e.g. *Heritiera littoralis* and *Pelliciera rhizophorae.* Buttress root provide huge trees stability especially in tropical areas, and the buttress roots can grow up.

82. Which of the following have succulent root ?
(a) Opuntia (b) Aloe
(c) Agave (d) Asparagus
Punjab MET-2005

Ans. (d) : Succulent root are found only in Asparagus. They are white or light in colour. Asparagus has succulent roots because the plant stores food in them, making them fleshy and helpful for perennation. Succulents absorb water through their roots from the surrounding air.

83. In one plant adventitious roots are modified for storage and in the other plant a lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is found. They are
(a) Sweet potato and Pistia
(b) Eichhornia and Jasmine
(c) Carrot and mint
(d) Turnip and Chrysanthemum
(e) Sweet potato and mint
Kerala PMT-2014

Ans. (a) : In one Plant adventitious roots are modified for storage and in the other plant a lateral branch with short internods and each node bearing a rosette of leaves and a tuft of roots is found they are sweet potato and pistia.

84. A root was described as it adventitious root because:
(a) arose from plumule
(b) was used variously for storage of food
(c) was swollen
(d) was growing in marshy place
VMMC-2007
Rajasthan PMT-2005
UPCPMT-2002

Ans. (a) : A root was described as it adventitious root because arise from plumule. Post embroyonic roots can develop from stems, leaves or other vegetative non root organs, either constitutively. Such root are referred to as adventitious.

85. Which of the following is a total root parasite?
(a) Rafflesia (b) Santalum
(c) Cuscuta (d) Monotropa
VMMC-2011

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Ans. (a) : Total parasites plants are heterotropic plants that depend entirely on the host plant, including shelter, water, and food for all their requirements. Rafflesia is a total root parasite. It is known as the queen of parasites.
• Cuscuta is total stem parasite, santalum is a woody flowering plant, monotropa is herbaceous perennial vine (also known as Indian pipe).

86. Rhizome which grows vertically upwards are:
(a) corms (b) stolon
(c) bulbils (d) root stock
AFMC-2005

Ans. (d) : Dense rhizomes grow vertically. They produce roots on the lower side while shoots grow upright from the head. Rhizome is known as a part of plant. It is also known as root stalk However, it is a stem that crops and grows horizontally under the ground and produces plant systems such as root and shoot of a new plant. Plant such as Banana and *Alocasia indica* represent rhizomes.

87. Tuberous roots are found in:
(a) *Beta vulgaris* (b) *Daucus carota*
(c) *Ipomoea batatas* (d) *Raphamus sativus*
Manipal-2004
Uttarakhand PMT-2004
AMU-2005

Ans. (c) : Tuberous roots are found in *'Ipomoea batatas'*. *Ipomeca batatas* are the scientific name of sweet potato. Tuberous roots have modified lateral storage roots. Some plants store food materials in their root. Plants like raddish, carrot and sweet potato are known as plants having tuberous roots. Tuberous root is the modification of adventitions root system.

88. Assimilatory roots are present in
(1) Loranthus and Viscum
(2) Tinospora and Trapa
(3) Saccharum and Pandanus
(4) Taeniophyllum and Podostemon
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2009

Ans. (c) : Assimilatory roots are present in Tinospora and Trapa and Taeniophyllum and Podostemon. Assimilatory roots modified adventitious roots that turn green and carry out photosynthesis. The assimilatory roots are present in the diversity of habitats. Tinospora has climbing photosynthetic roots. Trapa has under water root called hydrophytes. Taeniophyllum have flat ribbon like green velamen root viscum is parasitic plant.

89. Primary root is :
(1) positively geotropic
(2) positive hydrotropic
(3) negative geotropic
(4) negative hydrotropic
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct
BHU PMT (Mains)-2008, 2005

Ans. (b) : Primary root is positively geotropic and positively hydrotropic. It is the basic component of root systems, As the roots always grow in the downward direction or in the direction of the force of gravity they are regarded as positively geotropic. Roots are showing their positive hydrotropic nature. Who the root grows towards the presence of the moisture content then the roots are known as positively hydrotropic.

90. Which one is/are not rootless?
(1) Raphamus and Daucus
(2) Beta vulgaris and sweet potato
(3) Utricularia
(4) Wolffia
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct
BHU PMT (Mains)-2011

Ans. (b) : Rootless plants are which lack roots. Wolffia and utricularia both are root less plant and, the *Raphamus, Daucus, Beta vulgaris* and sweet potato are not a rootless plant.

91. Breathing roots are found in:
(a) Rhizophora (b) Epiphytes
(c) Avicennia (d) Both (a) and (c)
BHU PMT (Mains)-2011

Ans. (d) : Breathing roots are seen in Avicennia and Rhizophora plant. Avicennia have pneumatophores that project above the mud to facilitate gas exchange for the submerged primary roots. Pneumatophores or breathing roots are respiratory roots found in halophytes such as mangroves. Pneumatophores have open pores in the air called lenticels which help in absorbing O_2 directly from the air.

92. Haustorial root is exceptional to:
(a) Zea mays (b) Cactus
(c) Cuscuta (d) Orchids
BHU PMT (Mains)-2011
DUMET-2001
Manipal-2001

Ans. (c) : Haustorial root is exceptional to 'Cuscuta', Haustorial root is an underground portion of the plant that takes water and nutrients from the soil and serves as a string anchor few the plant. Cuscuta is the total stem parasitic plant which possesses haustorial roots for absorption of nutrients from the host plant.

93. Fibrous root system is better adapted than tap root system for :
(a) transport organic matter
(b) absorption of water and minerals
(c) storage of food
(d) anchorage of plant to soil
BHU PMT-2001

Ans. (d) : Fibrous root systems consists of many fine hair like roots that form a thick mat below the surface. These root systems are very effective at water and mineral absorption as well as plant stabilization. This root systems help prevent soil erosion as they anchor plants to the top layer of soil fibrous roots provide better and firm anchorage to the plant. It helps the plants of anchorage to soil very firmly.

94. The photosynthetic or assimilatory roots are observed in :
(a) Banyan (b) Vanda
(c) Cuscuta (d) Tinospora
J&K CET-2009

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Ans. (d) : Assimilatory roots are also known as photosynthetic roots. When exposed to the sun, develop chlorophyll and manufacture food. These roots can be found in terrestrial plants, aquatic plants and epiphyte like orchids. A plant with photosynthetic roots is 'Tinospora because these roots are aerial and green containing chlorophyll, so they absorb sunlight and photosynthesize.

95. The aerial, short and branched roots of an autotrophic plant that provide stability are known as :
(a) lateral roots (b) haustoria
(c) velamen roots (d) clinging roots

BCECE-2010
AP EAMCET - 2007

Ans. (d) : The aerial, short and branched roots of an autotrophic plant that provide stability are known as, 'clinging roots'. Clinging roots are example of adventitious roots. They are known as hygroscopic roots and are found in epiphytes and space parasites. This kind of root creates clinging or aerial roots after the plant attaches to the tree's bark. **Ex:-** Orchid

96. Find the incorrect match :
(a) Tap root — Carrot
(b) Adventitious root — Sweet potato
(c) Prop root — Banyan tree
(d) Stilt root — Turnip

AMU-2010

Ans. (d) : Stilt roots are found in maize and sugarcane. Stilt roots are adventitious roots that grow form lower stem nodes and join and become deeper in the soil. Turnip are the tuberous roots which are tap roots. Tuberous root arise from the node of stem and assume irregular in shape.

97. Dahlia and Asparagus possess:
(a) Stilt roots (b) Fusiform roots
(c) Tuberous roots (d) Fasciculated roots

AMU-1998

Ans. (d) : Dahlia and Asparagus possess the fasciculated type of roots. Fasciculated roots are tuberous roots that originate at the base of the stem and form clusters. They swell and become thick to store food. The fasciculated root of dahlia act as a vegetative propagation for the production of new plant.

98. Plant roots are usually devoid of chlorophyll and cannot perform photosynthesis. However, there are exceptions. Which of the following plant root can perform photosynthesis?
(a) Arabidopsis (b) Rice
(c) Tinospora (d) Hibiscus

KVPY SB & SX-2012

Ans. (a) : Plant roots can perform the photosynthesis. As root hair cells do not carry out photosynthesis, they do not contain chloroplasts. Plants roots usually do not have chlorophyll but some epiphytic plants grow green and accumulate chlorophyll for photosynthesis. Arabidopsis is the dicot plant which develops the chloroplasts in roots.

99. The plant which bears clinging roots is:
(a) trapa (b) orchid
(c) screw pine (d) podostemon

UP CPMT-2001
BHU PMT (Screening)-2007
JIPMER-2010

Ans. (b) : The clinging roots are non absorptive adventitious root arise from nodes or internodes. The plant which bears clinging roots is 'orchid'. Orchids are epiphytes, the clinging roots system, is present in them. Orchids live on the branches of trees so their roots are modified to absorb water from the atmosphere by hanging freely in the air.

100. The character found only in halophytes is:
(a) sunken stomata (b) vivipary
(c) velamen tissue (d) heterophylly

Haryana PMT-2009

Ans. (b) : The character found only in halophytes is 'vivipary'. Plant vivipary is the process of giving birth to young seedlings in advanced stages of development. It is commonly seen in mangroves like Rhizophora. Mangrove plants are salt-loving thus halophytes. In viviparous germination, the seeds germinate while still attached to the parent plant.

101. Pneumatophores the respiratory root are characteristic feature of :
(a) Avicennia (b) Sonneratia
(c) Rhizophora (d) All of these

VMMC-2014

Ans. (d) : Pneumatophores are also called respiratory roots. Pneumatophores are found in the vegetation which is found in marshy and saline lakes. The primary function of pneumatophores is to help plants to get the oxygen needed for the respiration process because the found at O_2 lack places. Here, Avicennia, Sonneratia and Rhizophora all of are the example of pneumatophores.

102. Stilt roots are reported from:
(a) pandanus (b) radish
(c) mango ginger (d) Bryophy/fum

Manipal-2013

Ans. (a) : Stilt roots are reported from pandanus also known as screw pine. Stilt roots provide mechanical support to the plants. In pandanus the stilt roots develop only from the lower surface of the oblique stem to provide support. These roots are adventitious and often branched. Other examples of stilt root are maize, sugarcane.

103. Velamen-is found in:
(a) Vanda (b) Rosa
(c) Viscum (d) Santalum

AMU-2005

Ans. (a) : Velamen is found in 'vanda'. Velamen is a spongy tissue which is found in all epiphytic orchids and vanda. It is made up of multiple epidermis that covers the roots. Velamen is found in the aerial roots. It is helpful in absorption of moisture from atmosphere, also synthesis food in presence of chloroplast.

104. The thick roots that hang down from a banyan tree are called:
(a) stilt roots (b) prop roots
(c) pneumatophores (d) buttress root

BHU PMT (Screening)-2011
J&K CET-2014

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Ans. (b) : The thick roots that hang down from a banyan tree are called prop roots. Simply a hanging roots of banyan trees are known as prop roots. These are the hanging adventitious roots arising from the aerial branches growing downwards, to provide the structural support of plants. Prop roots are pillar like roots, young prop roots hang in the air are hygroscopic, they appeared on absorption of water.

105. Special kinds of roots called pneumatophores are characteristics of the plants growing in:
(a) sandy soils
(b) saline soils
(c) marshy places and salt lakes
(d) dryland regions

Haryana PMT-2010

Ans. (c) : Special kind of roots called pneumatophores are characteristics of the plants growing in marshy places and salt lakes. These kind of roots are commonly found in mangrove species that grow in saline mud flats, these are found growing in saline marshes, roots growing vertically upwards become negatively geotropic, have breathing pore called pneumathores. They are present in Rhizophora and mangrove trees.

106. A type of cells called 'Velamen' occur in:
(a) orchid roots (b) lily roots
(c) grass roots (d) groundnut roots

AP EAMCET-1997

Ans. (a) : A type of cells called 'velamen' occur in orchid roots. Velamen is a specialized tissue found in the aerial roots of some orchids or vanda. Velamen is a spongy, multiple epidermis that covers the roots of some epiphytic or semi-epiphytic plants, such as orchid species. Velamen is provide support, prevent water less, and assist the plant in absorbing water directly from atmosphere. The epiphytic roots are devoid of root hairs and root caps.

107. In plants growing in marshy saline soils, the major function of roots that grow in the air above is to:
(a) respire (b) absorb moisture
(c) exude salts (d) absorb nutrients

AP EAMCET-1997

Ans. (a) : In plants growing in marshy saline soils, the major function of roots that grow in the air above is to respire. Their upper ends bear lenticels for exchange of gases. The plants which grow in the marshy areas are called mangroves. Pneumatophores are emerge out of soil and water, they are commonly known as breathing roots.

108. Root modification means:
(a) Permanent internal changes in the roots
(b) Temporary internal changes in the roots
(c) Permanent structural changes in the roots
(d) Temporary structural changes in the roots

J&K CET-2007

Ans. (c) : Root modification means permanent structural changes in the roots. Modification of the roots is simply the change found in physiology and morphology of the root for a particular adaptation as for storage of food, respiration, mechanical support. The roots are altered to allow a plant to adapt more effectively to the environment in different forms, by performing specific functions other than those of their normal function.

109. Dahlia has:
(a) tendrillar roots (b) respiratory roots
(c) nodular roots (d) storage roots

AP EAMCET-2000

Ans. (d) : Dahlia has a storage types of roots. Dahlia and Asparagus are some other examples of plants with modified roots for food storage. Storage roots are the roots that are specially modified for storage of food and water. In Dahlia fasciculated root is present in which roots arise in cluster from lower node of stem and thickened in entire length.

110. The following is a xerophyte, containing air spaces in the stem and roots:
(a) Eichhornia (b) Opuntia
(c) Aloe (d) Rhizophora

AP EAMCET-1999

Ans. (b) : Opuntia is a xerophyte, which is containing air spaces in the stem and roots. Its stem is modified into a succulent and flat green structure. Opuntia modified leaves thick cuticle and flat green leaf like structure is known as phylloclade's which performs the functions of photosynthesis. The leaves gets modified into spines to help in reducing transpiration.

111. Pneumatophores are usually present in
(a) Murraya (b) Eichhonia
(c) Avicennia (d) None of these

HP CET-2012
VMMC-2004

Ans. (c) : Pneumatophores are usually present in 'Avicinnea'. Pneumatophores are specialized roots developing in mangrove plants. Avicennia is a mangrove species. It develop a flat root system. Avicennia and Rhizophora are facultative halophytes and have mechanisms to inhibit salt absorption by their roots and to excrete salt from their leaves.

112. Which are of the following has epiphytic features and aerial and flattened photosynthetic roots, without formal organisation of stem and leaves?
(a) Tinospora (b) Trapa
(c) Taeniophyllum (d) Vanda

Manipal-2010

Ans. (c) : Taeniophyllum is an epiphytic orchid with thick flattened photosynthetic roots. These roots are green aerial, adventitious which prepare food materials by photosynthesis.
- Tinospora possesses aerial climbing photosynthetic root
- In trapa, the green assimilatory roots are submerged like other roots. They develop from stem nodes and are highly branched to increase photosynthesis.

113. Thigmotropism is best seen in
(a) tendrils (b) leaf apex
(c) root apex (d) stem apex

CMC Vellore-2009

Ans. (a) : Thigmotropism is best seen in tendrils. It is a movement due to contact with a foreign body. It is most conspicuous in tendrils, which coil around support and help the plant in climbing. It is best observed in tendrils and twining plants. It is also known as haptotropism. It is the movement or change in orientation of a plant's growth as a reaction to touch. Example of tendrils of sweet pea coiling around a support.

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114. Floating roots are the characteristic feature of
(a) Viscum (b) Cuscuta
(c) Vanda (d) Jussiaea

BCECE-2007

Ans. (d) : Floating plant have leaves that float on the water surface. Floating roots are the characteristic feature of 'Jussiaea'. Floating roots are the modification of adventitious roots. These roots arise from the node of the aquatic plants. It is most commonly in Jussiaea. These roots help in floating and respiration.

115. Pneumatophores are helpful in
(a) protein synthesis
(b) respiration
(c) carbohydrate metabolism
(d) transpiration

AMU-2003
MGIMS Wardha-2005

Ans. (b) : Pneumatophores are helpful in respiration process. It helps the plant to get oxygen for respiration. It helps in mangrove plant to absorb gases, such as nitrogen, and nutrients, such as iron, from poor soil. They are also called breathing roots. Simply it present in Rhizophora and mangrove trees.

116. When the root is swollen in the middle and tapers at both ends, it will be called as
(a) tuberous root (b) conical root
(c) fusiform root (d) napiform root

AMU-2001

Ans. (c) : When the root is swollen in the middle and tapers at both ends, it will be called as fusiform root. Fusiform roots are swollen in the middle portion and tapering towards the end. Example of fusiform root is radish fusiform means spindle shaped. Their primary junction is the storage of food.

117. Pneumatophores are found in :
(a) The vegetation which is found in marshy and saline lake
(b) The vegetation which found in saline soil
(c) Xerophytes
(d) Epiphytes

AIPMT-2000

Ans. (a) : Pneumatophores are found in the vegetation which is found in marshy and saline lake.
Pneumatophores, commonly found in mangrove species that grow in saline mud flats and grow upward out of the mud and water to oxygen intake for the submerged primary root system.

118. Respiratory roots are found in
(a) Rhizopus (b) Orchid
(c) Vallisnaria (d) Mangrove plants

UP CPMT-2005

Ans. (d): Pneumatophores or breathing roots or respiratory roots found in halophytes such as **mangroves**. They often grow in saline swamps, so breathing roots come out of the water to consume oxygen.
• **Rhizopus** is a genus of common saprophytic fungi on plants and specialized parasites on animals.
• Most **orchids** species grow in tropical forests but others can be found in semi- desert region, near the Seashore and in the tundra.
Vallisneria is a submerged plant that spreads by runners and sometimes forms tall underwater meadows.

119. Which of the following groups of plants are propagated through underground root?
(a) Pistia, Chrysanthemum and pineapple
(b) Ginger, potato, onion and zamikand
(c) Sweet potato, Asparagus, Tapioca and dahlia
(d) Bryophyllum and Kalanchoe

MGIMS Wardha-2013

Ans. (c) : When the plant propagation from the vegetative part of a parent plant through asexual mode is called as vegetative propagation. Vegetative propagation are mainly cutting, layering, grafting types. It uses several of the plant parts for reproducing the plant asexually. It is possible because of the presence of meristematic tissue capable of cellular differentiation, in many plant tissues.
A part of root, stem and leaf can promote adventitious roots and form a new plant. Some other plants have swollen fleshy roots called tuberous root. These tubers bear buds, which can develop into new plants if covered with moisture soil. **Example sweet potato, tapioca, dahlia and asparagus.**

120. Black pepper is
(a) herb (b) shrub
(c) tree (d) climber

Haryana PMT-2008

Ans. (d) : Black pepper (*Piper nigrum*)is a flowering vine, cultivated from its fruit, which is usually dried and used as a spice and seasoning. The pepper plant is a weak climbing or trailing shrub with adventitious roots. Black pepper is native to the Malabar coast of India and is one of the earliest spices known.

C. Stem and its Modification

121. The modified stem of Opuntia is
(a) phyllode (b) phylloclade
(c) cladode (d) staminode

JIPMER-2010
BHU PMT (Screening)-2007
CG PMT-2006
JIPMER-2005
Haryana PMT-2005
BHU PMT-2003
AMU-2001

Ans. (b) : The modified stem of opuntia is known as phylloclade. Opuntia is a xerophytic plant. Leaves are modified into spine, so the functions of photosynthesis is performed by stem which is thick, fleshy and flattened structures.

122. The underground stem that has contractile roots is:
(a) Rhizome (b) Corm
(c) Stem tuber (d) Bulb

AP EAMCET-2005
VMMC-2010
AFMC-2010
CMC Vellore-2010

Ans. (b): Corm– It is a condensed structure which grows vertically under the soil surface. They possess spherical node and internodes and they possess contractile roots. **Ex– Colocasia, Alocasia, Zaminkand etc.**

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a) Rhizome– It is a fleshy and horizontal stem found under the soil. Small nodes and internodes are found which are covered with scaly leaves.
Ex– Ginger, Turmeric, Canna, Water lily and Banana.
c) Stem tuber– The tip of underground branches become swollen in the soil. Eyes are found on them which are axillary buds and they are covered with scaly leaves. **Ex– Potato.**
d) Bulb– The stem is reduced and has a disc like structure which surrounds with numerous fleshy scaly leaves. Many roots arise from its base and food is stored in their fleshy leaves. They show apical growth. **Ex– Onion and Garlic.**

123. Medicinal plant of Solanaceae
(a) Atropa (b) Petunia
(c) Cestrum (d) Scilla

TS EAMCET 10.05.2023 Shift-I

Ans. (a) : The medicinal plant of solanaceae is Atropa belladonna that belong the family-Solanaceae.
The Atropa belladonna also called belladonna or deadly night shade.
The atropine a type of alkaloids that use dilate pupils of eyes. The Belladonna has used in herbal medicine for centrurles as a pain reliever.
Petunia is belonging to family Night shade
Cestrum is belonging to family Night shade
Scilla is belonging to family Asparagaceae.

124. Identify the correct set of statements :
(A) The leaflets are modified into pointed hard thorns in Citrus and Bougainvillea
(B) Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin
(C) Stem is flattened and fleshy in Opuntia and modified to perform the function of leaves
(D) Rhizophora shows vertically upward growing roots that help to get oxygen for respiration
(E) Subaerially growing stems in grasses and strawberry help in vegetative propagation
Choose the correct answer from the options given below :
(a) (A), (B), (D) and (E) Only
(b) (B) and (C) Only
(c) (A) and (D) Only
(d) (B), (C), (D) and (E) Only

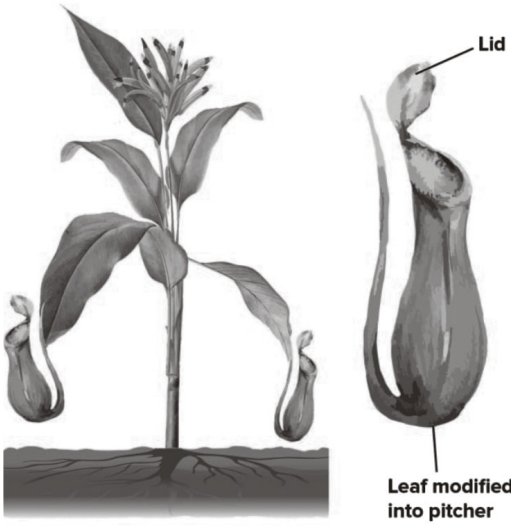
NEET-2022

Ans. (d) : Axillary buds of stems get modified into woody straight and pointed thorns. Thorns are found in many plants such as citrus and bougainvillea.
• Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin, in these plants the tendrils help in climbing and provide support.
• Stem is flattened and fleshy in Opuntia and modified to perform the function of leaves, the stem is modified to carry out photosynthesis due to the absence of leaves.
• Rhizophora shows vertically upward growing roots that help to get oxygen for respiration, these roots are called pneumatophores.
• Subaerially growing stems in grasses and strawberry help in vegetative propagation, these stem are called stolons and can form new plants when they touch the ground.

125. Which of the following is not stem modification
(a) Flattened structures of Opuntia
(b) Pitcher of Nepenthes
(c) Thorns of citrus
(d) Tendrils of cucumber

AP EAMCET-03.09.2021 Shift-II
NEET-2016 Phase-I

Ans. (b) : Pitcher of Nepenthes or pitcher plant is a modification of leaf not stem. It is a plant that is insectivorous. In this plant a pitcher like structure is transformed from a leaf lamina that traps insects.



Pitcher plant showing lid and pitcher

Stems of some plants are modified to perform different functions. Tendrils develop from axillary buds are spirally coiled and help plants to climb such as in cucumber. Opuntia, a plant grows in arid reasons modify their stem into flattened structure. In citrus fruits stems modified into pointed thorns to protect plants from grazing animals.

126. Vegetative propagule of Curcuma is_____
(a) Runner (b) Rhizome
(c) Offset (d) Corm

AP EAPCET-07.09.2021 Shift-I

Ans. (b) : Vegetative propagule of Curcuma is Rhizome. A rhizome is an underground part of the plant that run horizontally and has the ability to produce root and shoot systems in plant.

127. What is the eye of potato?
(a) Axillary Bud (b) Accessory Bud
(c) Adventitious Bud (d) Apical Bud

AP EAMCET-25.09.2020 Shift-I

Ans. (a) : Axillary bud is the eye of potato. Potato eyes are sprouts, and they occur when the potato is ready to begin its next phase of life, growing new Potatoes.

128. Which are the modified parts of cladophylls?
(a) Leaf
(b) Petiole
(c) Branches of limited growth
(d) Branches of unlimited growth

TS EAMCET-29.09.2020 Shift-I

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Ans. (c) : Branches of limited growth modified parts of cladophylls. Cladophylls is one of the parts of the plant. It is modified part of the stem, and it resemble the function of the leaf.

129. Which of the following is the sink end of the plant?
(a) Stem tuber (b) Cotyledon
(c) Leaf (d) Apical bud

MHT CET-2019

Ans. (b) : Cotyledon is the sink of the plant and rhizome. Sink are related to transport of organic solutes.

130. Which ONE of the following properties causes the plant tendrils to coil around a bamboo stick?
(a) Tendril has spines
(b) The base of the tendril grows faster than the tip
(c) Part of the tendril in contact with the bamboo stick grows at a slower rate than the part away from it
(d) The tip of the tendril grows faster than the base

KVPY (SA)-2018

Ans. (c) : Tendrils are sensitive to touch and when they come in contact with an object they do not move as fast as the part of the tendril away from the object. This causes the tendrils to coil around the object and thus cling to it tendrils are considered to be modified flower clusters which are themselves viewed as modified shoots.

131. Tendrils are modifications of:
(a) stem or leaf (b) stem only
(c) leaf only (d) aerial roots only

KVPY (SA)-2018

Ans. (a) : Tendrils may be modified leaves, leaflets, leaf tips or leaf stipules they may however, be derived as modified stem branches. They help in support and attachment by clasping, gripping near by objects. Example - grapes.

132. The 'eyes' of potato are located at the____
(a) Root apex (b) Leaf apex
(c) Nodes (d) Inter-nodes

MHT CET-2018

Ans. (c) : The 'eyes' of potato are located at the nodes. Potato tubers have nodes or eyes from which the new growth begins. The new stems growing from each eye are called sprout which rise to the new plant.

133. In watermelon the spirally coiled stem modifications which help in climbing are developed from
(a) Apical bud (b) Adventitious bud
(c) Axillary bud (d) Terminal bud

TS EAMCET-02.05.2018 Shift-I

Ans.(c): In watermelon the spirally coiled stem modification which help in climbing are developed from Axillary bud. Tendrils are specialized stem or leaf modification. Which are thread-like structures used by climbing plants for support and attachment.

134. Phylloclade is the modification of:
(a) root (b) stem
(c) leaf (d) flower

Tripura JEE-2017
J&K CET-2002
Rajasthan PMT-2001

Ans. (b) : Phylloclade is the modification of stem in plants for carrying out photosynthesis as well as for structural support and survival.

135. Potato is cultivated by:
(a) seeds (b) buds
(c) root cutting (d) tubers

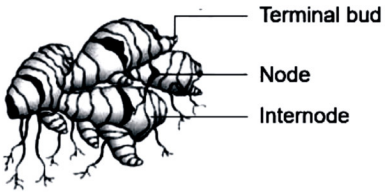
BHU PMT-2002

Ans. (d) : Potato is cultivated by tubers. The cultivated potato (S. tuberosum) is divided into two sub - species *Solanum tuberosum* and *Andigena*.

136. In ginger vegetative propagation occurs through:
(a) Offsets (b) Bulbils
(c) Runners (d) Rhizome

AIPMT-2015

Ans. (d) : In Ginger, vegetative propagation occurs through **Rhizome.** Rhizomes are stems which grow horizontally under the ground. In ginger the underground stem are swollen with food reserves. The terminal bud grows upward to produce the flowering shoot and the lateral buds grow out to form new plant.



Rhizome – Ginger

137. When we peel the skin of a potato tuber, we remove:
(a) periderm (b) epidermis
(c) cuticle (d) sapwood

Assam CEE-2014

Ans. (a) : When we peel the skin of a potato tuber we remove Periderm. Periderm potato is underground stem with this mind, the "skin" or periderm of the potato tuber very much resembles the bark on the stem (trunk) of a tree like the bark of a tree, the periderm is a tough coating that protects from moisture loss and from invasion by diseases, insects and other pests.

138. Which one of the following is an example for sub-aerial modification of stem ?
(a) Agave (b) Oxalis
(c) Asparagus (d) Tridax
(e) Polyalthia

Kerala PMT-2009

Ans. (b) : Oxalis sub-aerial modification of stem. Oxalis is a large genus of flowering plants in the wood sorrel family oxalidaceae.

139. In opuntia spines are modification of:
(a) Stem (b) root
(c) leaf (d) flower

AIIMS-2000

Ans. (c) : Spines are also modified leaves. In opuntia spines are fully transformed leaves that protect the plant from herbivores, radiate heat from the stem during the day, and collect and drip condensed water vapour during night.

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140. Ginger is a stem and a root because it:
(a) lacks chlorophyll
(b) grows parallel to soil surface
(c) stores food material
(d) has nodes and internodes

Haryana PMT-2008
JIPMER-1999
AIIMS-1998

Ans. (d) : Ginger is a stem and a root because of has nodes and internodes. The ginger plant has a thick, branched rhizome (underground stem) with a brown outer larger and yellow centre that has a spicy citrasy aroma.

141. An example of edible underground stem is:
(a) Carrot (b) Groundnut
(c) Sweet potato (d) Potato

AIPMT-2014

Ans. (d) : Modified stems located below ground are bulbs, corn, rhizomes, and tubers. Potato is the edible portion is an underground stem that is a tuber.
• Carrot is a modified tap root for storage of food. Groundnut is an edible seed.
• Sweet potato is a modified adventitious root specialised for food storage.

142. Identify a pair of the following plants, which show modification of axillary buds into tendrils and hooks respectively
i. Hugonia **ii. Duranta**
iii. Passiflora **iv. Dioscorea**
(a) i, ii (b) ii, iii
(c) iii, i (d) iv, i

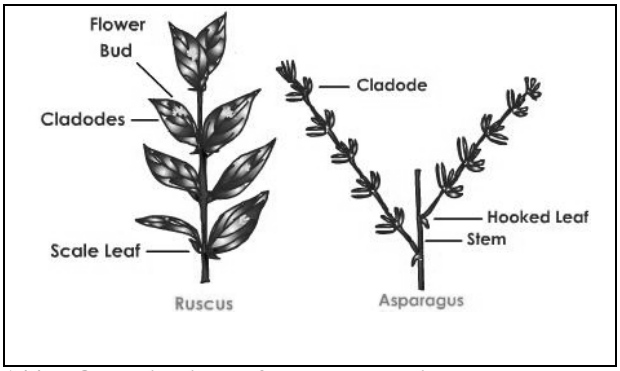
AP EAMCET-2008

Ans. (c) : Tendrils are a modification of stem as modified axillary bud in **Passiflora**. In some plants, terminal leaf lets are modified into curved hooks for helping the plant in climbing such structures are called hooks. **Example -Hugonia.** Tendrils are a thread like structures which helps the plant in climbing.
• **Duranta** is a genus of flowering plants in the Verbena family. They are commonly cultivated as hedges and ornamental plants.
• **Dioscorea** is a genus family **Dioscoreaceae.** The vast majority of the species are tropical, with only a few species extending into temperate climates.

143. 'Cladode's is a characteristic morphological feature of:
(a) Asparagus and Ruscus
(b) Casuarina and Opuntia
(c) Cladophora and Cactus
(d) Citrus and Euphorbia

AMU-1997
AIIMS-2014

Ans. (a) Cladode is a modified stem in which the branches of limited growth become green and flat-like leaf, eg.–Asparagus and Ruscus. They may store food for the plant.



144. Organisation of stem apex into corpus and tunica is determined mainly by:
(a) Planes of cell division
(b) regions of meristematic activity
(c) rate of cell growth
(d) rate of shoot tip growth.

AIPMT-1988
BVP-2008

Ans. (a) : Tunica carpus theory discover by **Schmidt (1924).** Tunica and corpus 2 regions can be distinguished by their plane of cell division.
• **Tunica :-** It is the outer zone consisting of one or more peripheral layer of cells. In dicotyledons, there are one to five layers of tunica while in monocotyledons, there are one to three layer of tunica. They undergo anticlinal division. The outer layer primordia and hypodermal cells.
• **Carpus :-** Carpus is the central undifferentiated multilayered mass of cells surrounded by tunica. The cells are comparatively layer and divided by irregular division in all planes and from procambium and ground meristem.

145. An underground specialized bud with reduced disk like stem, covered with fleshy leaves is called:
(a) bulb (b) rhizome
(c) bulbil (d) rhizophore

J&K CET-2000

Ans. (a) : A bulb consists of relatively large, usually globe shaped, underground bud with membraneous or fleshy overlapping leaves arisig from a short stem. Bulbs are produced by monocotyledons plants in which the usual structure is modified for storage and reproduction.

146. Part of the plant which is cultured to obtain virus free clones is:
(a) leaf (b) root tip
(c) shoot tip (d) embryo

JCECE-2007

Ans. (c) : Part of the plant which is cultured to obtain virus free clones is shoot tip. Shoot tip culture is the culture of terminal part of shoot to a plant in in-vitro condition or in lab called as shoot tip culture.
Mostly the shoot tip culture used for obtain disease free plant without genetically changes.

147. The underground stem of this genus is a rhizome:
(a) Allium (b) Gloriosa
(c) Scilla (d) Lilium

Uttarakhand PMT-2010

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Ans. (b) : The underground stem of this genus is a rhizome Gloriosa.
• Gloriosa is a perennial herb growing from a fleshy rhizome. The plant is used to cure arthritis, gout rheumatism, inflammation, ulcers, bleeding, skin diseases, leprosy, snakebites etc.

148. Which of the following plants have long slender and coiled stem tendrils developed from axillary buds ?
(a) Grapevine and pumpkins
(b) Australian acacia and watermelon
(c) Bougainvillea and cucumber
(d) Strawberry and grapevine
(e) Alstonia and pumpkins

Kerala PMT-2011

Ans. (a) : Grapevine and pumpkin plants have long slender and coiled stem tendrils developed from axillary buds. That form in very leafless and spirally coiled branches and help the vulnerable plant climb a support referred to as a stem tendrils.

149. Ginger multiplies vegetatively by:
(a) tuber (b) corm
(c) sucker (d) rhizome

DUMET-2004

Ans. (d) : Ginger multiplies vegetatively by rhizome although often referred to as ginger root, ginger actually comes from the rhizome. As cardamom and turmeric etc.

150. Stem modified for photosynthetic function by appearing like leaves are known as:
(a) Phyllode (b) Phylloclade
(c) Cladode (d) Tendril

MP PMT-2013

Ans. (b) : Stem modified for photosynthetic function by appearing like leaves are known as phylloclade. Leaves are the main sites for photosynthesis, the process by which plants synthesize food.

151. Cladode is a modification of:
(a) stem (b) root
(c) leaf (d) petiole

J&K CET-2013

Ans. (a) : Cladode is a modification of stem. Cladodes (also called cladophylls or phylloclades) are shoot systems in which leaves do not develop rather, the stems, become flattened and assume the photosynthetic functions of the plant.

152. In sweet pea tendrils are modified:
(a) stipule (b) stem
(c) leaf (d) leaflet

Rajasthan PMT-2002

Ans. (d) : In sweet pea tendrils are modified leaflet. Tendrils may be modified leaves leaflets, leaf tips or leaf stipules they may however, be derived as modified stem branches.

153. Turmeric a commonly used colorant and antiseptic is taken from which part of the plant?
(a) Stem (b) Root
(c) Flower (d) Fruit

Haryana PMT-2001

Ans. (a) : Turmeric (Curcuma domestica) a commonly used colorant and antiseptic is taken from stem part of the plant. Turmeric has been put to use as a food stuff, cosmetic and medicine. It is widely used as a spice in South Asian and Middle Eastern cooking.

154. Assertion (A) : Subaerial stem modifications participate in vegetative reproduction.
Reason (R) : They store water and food
(a) (A) and (R) are correct, (R) explains (A) correctly.
(b) (A) and (R) are correct, (R) explanation incorrect.
(c) (A) is correct, (R) is false.
(d) (A) is false, (R) is correct.

AP EAMCET-2015

Ans. (c) : Sub aerial stems are modified for vegetative reproduction are runners, stolons, suckers and offsets are different type of sub aerial stem modifications.

155. Which one of the following is not an insectivorous plant?
(a) Monotropa (b) Drosera
(c) Utricularia (d) Nepenthes

J&K CET-2010

Ans. (a) : Monotropa is parasitic upon a fungus that is in a symbiotic relationship with a hemlock tree. Monotropa uniflora also known as ghost plant, ghost pipe or Indian pipe is an herbaceous perennial plant.

156. Which one of the following is a modified stem that performs photosynthesis ?
(a) Tendrils (b) Bulbils
(c) Phylloclades (d) Prickles

J&K CET-2010

Ans. (c) : Phylloclades is a modified stem that performs photosynthesis. Phylloclades and cladodes are flattened, photosynthetic, shoots, which are usually considered to be modified branches.

157. Cladodes are found in:
(a) Asparagus (b) Opuntia
(c) Parkmsonia (d) Psidium guajava

Rajasthan PMT-2003
Manipal - 2002

Ans. (a) : Cladodes are found in *Asparagus*. Cladodes also called cladophylls or phylloclades) are shoot systems in which leaves do not develop rather then stems become flattened and assume the photosynthetic functions of the plant.

158. Stem is reduced in:
(a) Rhizome (b) Corm
(c) Bulb (d) Tuber

BHU PMT (Mains)-2007

Ans. (c) : Stem is reduced in bulb. Onion has the most reduced form of stem as it is a bulb. Bulb is a modified stem that is the resting stage of certain seed plants particularly perennial monocotyledons. A bulb consists of a relatively large, usually globe shaped under ground bud with membraneous or fleshy overlapping leaves arising from a short stem.

159. Pseudostem develops in:
(a) Ginger (b) Eichhomia
(c) Banana (d) Asparagus

BVP-2011

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Ans. (c) : The Pseudostem is the part of the banana plant that looks like a trunk. Which consists of a soft central core and tightly wrapped up to 25 leaf sheaths, it is fleshy and mainly consists of water.

160. A tree that has strong erect stem with hollow internodes and solid nodes is known as:
(a) Caudex (b) Deliquescent
(c) Scape (d) Culm

J&K CET-2011

Ans. (d) : A tree has strong erect stem with hollow internodes and solid nodes is known as Culm. Culm is an aerial stem which bearing flower. eg.:- Bamboo and grass

161. Stem tendrils are seen in:
(a) Citrus and Bougainvillea
(b) Citrus and Watermelon
(c) Cucumber and Pumpkins
(d) Opuntia and Bougainvillea
(e) Pistia and Eichhornia

Kerala PMT-2013

Ans. (c) : Stem tendrils are seen in cucumber and pumpking. It is develop form auxillary buds.

162. Which of the following is not a rhizome?
(a) Nelumbium (lotus) (b) Curcuma (turmeric)
(c) Crocus (kesar) (d) Zingiber (ginger)

JCECE-2015

Ans. (c) : *Crocus sativus* also known as *Autumn crocus* or *Saffron crocus*, is the only variety that produces an edible part.

163. Which of the following has most reduced form of stem?
(a) Rhizome (b) Stolons
(c) Runner (d) Bulb

Uttarakhand-2005
AIIMS-2000

Ans. (d) : 'Bulb', has most reduced form of stem. Onion is an example for Bulb. In some plants, the stem is in the form of a reduced small disc which is not differentiated into nodes and internodes. Stem is extremely reduced in bulb. A bulb is a short stem with leaves or leaf bases.

164. Hydrophytes are characterised by :
(a) thick and large leaf
(b) delicate and mucilagenous stem
(c) short spinous stem
(d) all of the above

MGIMS Wardha-2003

Ans. (b) : Plants which are growing near water or in water is known as hydrophytes plants.
- Root system and conducting tissue is poorly developed. There plants are spongy.
- The plant body of these plants usually thin and delicate. Leaves are very thin membranous and the stem is slender and may remain covered with mucilage.

165. The interxylary phloem is found in the stem of:
(a) Cucurbita (b) Salvia
(c) Calotropis (d) None of these

JIPMER-2013

Ans. (c) : Interxylary phloem is strands or bands of phloem embedded within the secondary xylem of a stem or root of a plant that has a single vascular cambium. Initially vascular bundle behave normally of forming secondary xylem towards inner side and secondary phloem towards outerside. But later it produce small patches of secondary phloem towards inner side which are embedded in secondary xylem. There patches are termed as interxylary phloem.

166. Potato is a modification of:
(a) stem (b) rhizome
(c) root (d) leaf

UP CPMT-2009
Punjab MET-2009

Ans. (a) : Potato is a type of storage stem that has been modified it grows from underground stems. potato is rich in starch. Tuber is thickend part of a stem which grows underground. Tubers have bud from which a new plant can arise by vegetative propagation.

167. Cotton fibre is basically a type of
(a) trichome (b) scale
(c) dried seed coat (d) non glandular hair

WB JEE-2010

Ans. (c) : Cotton fibres are the purest form of cellulose, nature's most abundant polymer, nearly 90% of the cotton fibres are cellulose.
Cotton fibre is obtained from the seed part of the flower.
- The raw fibres are separated from the seeds by a process known as ginning.

168. How does pruning help in making the hedge dense ?
(a) It induces the differentiation of new shoots from the rootstock
(b) It frees axillary buds from apical dominance
(c) The apical shoot grows faster after pruning
(d) It releases wound hormones

JCECE-2009

Ans. (b) : Pruning help in making the hedge dense as it frees the axillary buds from apical dominance. Apical buds produce high concentration of hormone auxin which inhibits the growth of lateral buds. When the apical buds are removed by pruning, the lateral bud grow. This produces dense bushy growth.

169. One of the plants introduced from the new world to the old world is:
(a) wheat (b) potato
(c) rice (d) sugarcane

BHU PMT (Mains)-2009

Ans. (b) : One of the plants introduced from the new world to the old world is potato.
The plants that were native to the Americas (new world) have been spread around the world (old world) through the columbian exchange. These plants include potato, sweet potato, tomato and maize etc.

170. Stem is modified into cladode:
(a) Casuarina (b) Asparagus
(c) Opuntia (d) Euphorbia

J&K CET-2008

Ans. (b) : Cladodes (modified stem) are the short, fleshy and green stems that have single internodes. The cladode is the aerial modification of the stem.
A very common example of sessile stem modified to form the cladode in Asparagus.

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171. Which of the odd type of vegetable in a basket containing the following?
(a) Beet roots (b) Potatoes
(c) Carrots (d) Radishes
Karnataka CET-2002

Ans. (b) : Radishes, Beet roots and carrots are thick fleshy and bulging to enable then to store food. They for the roots of the plant whereas potato is a modification of stem.

172. Zingeber officinale is a:
(a) leaf (b) modified stem
(c) root (d) modified root
UP CPMT-2012

Ans. (b) : *Zingeber officinale* or ginger is under-ground modified stem called a rhizome. Ginger is widely used as a spice and is ayurveda and traditional medicine.
Rhizome do not perform the function of roots, i.e. anchorage and obsorption, rather serves as reservoir for storage food.

173. The aerial vertical stout part of the banana is formed the :
(a) stem (b) leaf sheaths
(c) lamina of leaves (d) midrib of leaves
JIPMER-1999

Ans. (b) : The aerial vertical stout part of the banana is formed the leaf sheaths. The banana leaf consists of a long, tube like structure called a sheath.
The tight packing of numerous sheaths form the pseudostem. One pseudostem may have over 40 leaves during its lifetime.

174. The prickly pear plant, which is botanically named as Opuntia is an excellent example of
(a) Phyllode (b) Cladode
(c) Phylloclade (d) None of these
AMU -2000

Ans. (c) : The prickly pear plant, which is botanically named as opuntia is an excellent example of phylloclade. Phylloclade is the modification of stem. The stem becomes flattened, green, leaf like and performs photosynthesis.

175. Green leaf-like modified aerial stems/branches with a single internodes are called:
(a) Phylloclades (b) Phyllodes
(c) Bulbils (d) Cladodes
Karnataka CET-2003

Ans. (d): They are flattened leaf-like branches and structure that are photosynthetic in nature.
Phylloclade usually having one or two internodes long and succulent is called as cladode.

176. An example of xerophytic plant with cladode is:
(a) Asparagus (b) Aloe
(c) Agave (d) Argemone
AP EAMCET-2001

Ans. (a) : Xerophytic exhibit a number of special features in their morphological organs. Its structures minimize transpiration cladodes are an aerial modification of the stem which help reducing the transpiration.
cladode may be made up of only inter node.
ex:- *Asparagus*.

177. Viscum is a:
(a) total root parasite (b) total stem parasite
(c) partial root parasite (d) partial stem parasite
AFMC-2004

Ans. (d) : *Viscum album* is a partial stem parasite as it absorb only minerals and water from the host and does not absorb food. It is capable in making food its own by photosynthesis.

178. Corm is an:
(a) Underground vertical leaf
(b) Underground swollen stem
(c) Underground horizontal root
(d) Underground horizontal leaf
MGIMS Wardha-2011

Ans. (b) : An underground stem axis with swollen bare and enclosed by dry scale like leaves is called as corm. The shape of the corm is almost spherical or somewhat flattened from top to bottom due to excessive deposition of food material.

179. A horizontal underground stem is a:
(a) corm (b) phylloclade
(c) rhizome (d) rhizoid
DUMET-2009

Ans. (c) : A horizontal underground stem is a rhizome. Rhizome is the modification of stem for the production of the new plants. They are also called as root stock for eg. :- Ginger, Iris and Violet.
Rhizomes are used to store starches and protein which helps plants to survive under unfavourable season.

180. Thorns which help in climbing are found in:
(a) Carissa (b) Ulex
(c) Bougainvillea (d) Lawsonia
AP EAMCET-2000

Ans. (c) : Thorns which help in climbing are found in Bougainvillea. In Bougainvillea, The axillary bud gets modified into a woody thorn. Thorns are curved which helps the plant in climbing.

181. In which of the following plants does the stem performs the function of storage and perennation?
(a) Wheat (b) Ground nut
(c) Raddish (d) Ginger
CMC Vellore-2014

Ans. (d) : Ginger is an underground stem. It is the modification of stem and produce the new plants. It store food, so it is fleshy and can survive in drought condition.

182. In Ruscus , the stem is a:
(a) Phyllode (b) Cladode
(c) Offset (d) Sucker
Rajasthan PMT-2011
JIPMER-2011

Ans. (b) : In Ruscus, the stem is a cladode are a type of phylloclade which only has one internode. Cladodes are an aerial modification of the stem to reduce transpiration in plant.
The leaves are either present as scales or highly reduced.

183. In turmeric stem is a:
(a) Tuber (b) Bulb
(c) Rhizome (d) Corm
Rajasthan PMT-2011

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Ans. (c) : In turmeric stem is a Rhizome. Rhizomes found below in soil. It possess nodes and internodes and is fleshy due to the storage of food. It is also known as root stock.
Rhizome is the modification of stem for the production of new plants.

184. Dahlia is propagated through:
(a) Roots (b) Stem
(c) Bud (d) Leaf

BCECE-2009

Ans. (b&a) : Dahlia is propagated through stem. Dahlia possess tuberose roots and new plants arise from buds present on roots dahlia reproduce asexually through vegetative tissue known as bulbs.

185. Passiflora is an example of:
(a) cladode (b) thorn
(c) stem tendril (d) phylloclade

Haryana PMT-2011

Ans. (c) : *Passiflora* is an example of stem tendril A thin, thread - like structure used by climb as for support and attachment by parasitic plants. Generally by coiling around the suitable host found by touch is called a stem tendril. They may be branched or unbranched.
Common examples of tendril - Producing plants are the grape, members of the squash or melon family (cucurbitaceae) the sweet pea (*Lathyrus odoratus*), and the passion flowers (passiflora species).

186. Rootstock is:
(a) found in Musa and Alocasia
(b) is underground stem
(c) Specialized rhizome growing up vertically instead of horizontally
(d) All of these

Haryana PMT-2011

Ans. (d) : Rootstock is an underground stem called specialized rhizome which grows vertically upward instead of horizontal.
Rootstock is the base and root portion of a grafted plant. It is found is Musa and Alocasia.

187. Stems modified into flat green organs performing the functions of leaves are known as:
(a) Scales (b) Cladodes
(c) Phyllodes (d) Phylloclades

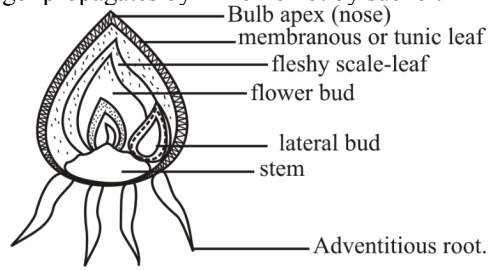
NEET-2016 Phase-I
JIPMER-1998

Ans. (d) : Stem modified into flat-green organs performing the functions of leaves are known as Phylloclades.
• Cladode is also a phylloclade but is of limited growth.
• Phyllodes are modified petioles which are leaf like in appearance and function.
• Scales are non-green and do not take part in photosynthesis.

188. Which one of the following is correctly matched?
(a) Chlamydomonas-Conidia
(b) Yeast-Zoospores
(c) Onion-Bulb
(d) Ginger-sucker

AIPMT (Screening)-2012

Ans. (c): Onion propagate by bulb which is an underground, modified stem.
A bulb consists of a relatively large, usually globe shaped, underground bud with fleshy overlapping leaves arising from a short stem.
• Chlamydomonas is an algae and conidia are not found in algae.
• Yeast and other ascomycetes characteristically produce ascospores.
• Ginger propagates by rhizome not by sucker.



189. Phyllode is present in:
(a) Australian Acacia (b) Opuntia
(c) Asparagus (d) Euphorbia

AIPMT (Screening)-2012

Ans. (a) : Phyllode is a modified petiole or a shoot that connects the stem with leaf and its function resembles that of leaf eg. Australian Acacia.
In several species of Acacia found in the deserts of Australia, the bipinnate lamina is absent.
Instead petiole and part of the rachis become flattened into sickle shaped structure for performing the function of food synthesis.

190. Which one of the following statement is correct?
(a) Flower of tulip is a modified shoot
(b) In tomato, fruit is a capsule
(c) Seeds of orchids have oil-rich endosperm
(d) Placentation in primrose is basal

AIPMT (Screening)-2011

Ans. (a) : In the tulip, flower is a modified stem.
Their flower buds are known for being perfectly symmetrical.
Tulips are the national flower of both Iran and Turkey.
- The fruits of the tomato are of berry type.
- The seeds of orchids are non- endospermic.
- Placentation is arrangement of the ovules on the placenta inside the ovary. Primrose has a free central placentation.

191. Phylloclades are
(a) green, photosynthetic, succulent stems of indefinite growth
(b) one internode long stems
(c) leaf modifications
(d) none of the above

J&K CET-2004

Ans. (a) : Phylloclades are green photosynthetic, often succulent stems of indefinite growth. Phylloclade formation is an adaptation for xerophytes. eg. *Opuntia, Casuarina* etc.
• Some plant groups instead have flattened green stem as the chief photosynthetic organs. These are called either cladodes or phylloclades.

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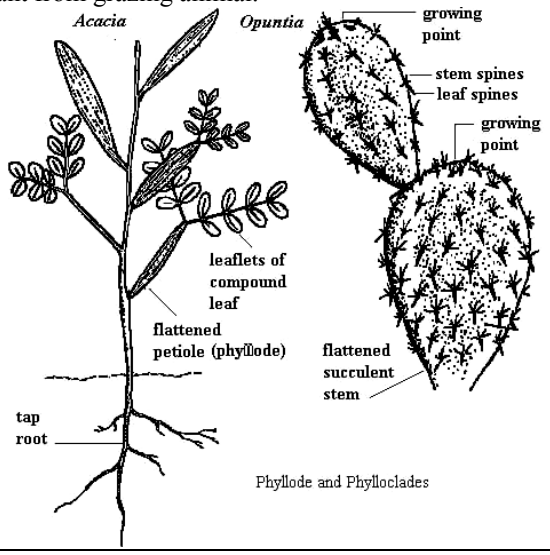
D. Leaf and types of Leaf and its Modification

192. Leaves become modified into spines in:-
(a) Pea (b) Onion
(c) Silk Cotton (d) Opuntia

AIPMT-2015
AP EAMCET-1998
CMC Vellore-2011
BHU PMT (Mains)-2011
JCECE-2005
Manipal-2000
Punjab MET-2014

Ans. (d) : The leaves are modified into spines in opuntia. Opuntia is a Xerophytic plant, It grows in the desert where water is very limited. In it, the leaves of areoles are modified into sharp and pointed spines, their main function is the protection, spines help to reduce the loss of water by transpiration, they also protect the plant from grazing animal.



193. When a plant has different types of leaves, the condition is known as
(a) heterophylly (b) anisophylly
(c) myrmecophily (d) None of the above

BVP-2014
VMMC-2005
AMU-2004
BVP-2003

Ans. (a) : The plant which show more than one type of leaves or shape of leaves on the same or different stem is known as heterophylly. The phenomenon is seen in semi-aquatic plants. Ex. *Limnophila*.
Anisophylly:- Plant having pairs of leaves with significant difference in their size between two leaves.

194. In a dorsiventral leaf the position of xylem
(a) Xylem surrounds phloem.
(b) Xylem is towards adaxial epidermis
(c) Xylem is surrounded by phloem.
(d) Xylem is towards abaxial epidermis.

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : The dorsiventral leaf the position of xylem is form when xylem is towards adaxial epidermis.
When xylem surrounds phloem this condition is called Concentric upto centric or Amphivasal.
When xylem is surrounded by phloem is called amphivasal vascular bundle.

195. The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called:
(a) Redifferentiation (b) Development
(c) Plasticity (d) Differentiation

NEET (Re-Exam)-04.09.2022

Ans. (c) : The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called Plasticity.
E.g :- Heterophylly in cotton, coriander and larkspur.

196. The side of flower facing the mother axis is called _____
(a) Anterior side (b) Posterior side
(c) Dorsal side (d) Ventral side

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : The side of flower facing the mother axis is called as posterior side.While the side of the bract is anterior side.

197. Integuments are absent in _____
(a) Helianthus (b) Loranthus
(c) Polygonum (d) Datura

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Each ovule has one or two protective envelops called integuments. Loranthus is a parasitic plant in which protective envelops i.e. integuments are absent which grow on the branches of woody trees.

198. Strobilanthes kunthiana flowers once in ____.
(a) 100 years (b) 30 years
(c) 12 years (d) 50 years

AP EAMCET-03.09.2021 Shift-II

Ans. (c) : Strobilanthes kunthiana is a shrub that found in the shola forests of the Western Ghats in Kerala. The purplish blue flower blossoms only once in 12 years, and gave the Nilgiri mountains range its name, from the Tamil Nil(blue) + giri (mountain).

199. Choose the correct statements of the following
(A) A bud is present in the axil of leaflets of the compound leaf
(B) *Casuarina* has limited growth of branches as *phylloclades*
(C) Sub aerial stem of *Oxalis* spread to new niches when old parts die
(D) Pericarp and seed coat fuse together in *caryopsis*
(a) A, B, C (b) A, C, D
(c) A, B, D (d) B, C, D

TS EAMCET-10.08.2021 Shift-I

Ans. (d) : Axillary bud is present in the axil of petiole of the compound leaf but not at the axil of leaflets of compound leaf.
- The *Casuarina* has limited growth of branches as phylloclades.
- Sub aerial stem of *oxalis* spread to new niches when old part die.
- The pericarp and seed coat fuse together in *caryopsis*.

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200. Isobilateral leaf shows following difference with dorsiventral leaf, except _____
(a) Stomata are present on both sides
(b) Well differentiated mesophyll
(c) Bulliform cells
(d) Parallel venation

AP EAMCET-05.10.2021 Shift-I

Ans. (b) : isobilateral leaf shows difference with dorsiventral leaf except well differentiated mesophyll. In case of isobilateral leaf, the mesophyll tissue in the leaves is not differentiated.

201. Assertion (A) : In Nepenthes leaves are modified to trap insects
Reason (R) : Insects serve as nitrogen supplements
(a) Both A & R are true but R is not the correct explanation of A
(b) Both A & R are true and R is the correct explanation of A
(c) A is true R is false
(d) A is false R is true

AP EAMCET-25.09.2020 Shift-II

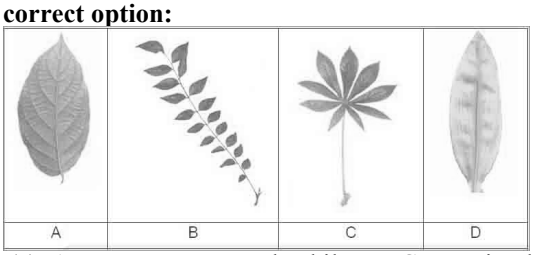
Ans. (b) : Nepenthes is an insectivorous plants. The plants modified their leaves to acquire nitrogen by capturing insects. Nepenthes capture prey with a pitfall trap that release on a microstructure, slippery surface.

202. A student observes grass and Hibiscus plants in his garden during noon. To his surprise, only the leaves of grass were found rolled inwards. The reason could be.
(a) presence of more number of stomata on the grass leaves.
(b) undifferentiated mesophyll in grass leaves
(c) presence of Bulliform cells in the grass leaves
(d) due to higher rate of transpiration.

Karnataka CET-2020

Ans. (c) : In grasses, certain adaxial epidermis have a large, empty, colourless cells, called bulliform cells. When the bulliform cells in the leaves have absorbed water and are turgid, the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inward to minimize water loss.

203. Identify the given diagrams and mark the correct option:



(a) A, D are compound while B, C are simple leaves
(b) A, D are simple while B, C are compound leaves
(c) A, B are simple while C, D are compound leaves
(d) A, B are compound while C, D are simple leaves

AIIMS-26.05.2019 Shift-I

Ans. (b) : A and D are simple leaf but B is pinnate compound leaf and C is palmately compound leaf type.
• A simple leaf is single leaf that is never divided into smaller leaflet units. It is always attached to a twig by its petiole. The compound leaf is a leaf whose leaflets are attached to the middle vein (rachis) but have their own stalks.
• Simple:- A leaf with one blade which may be entire or incised to any depth but not upto the mid-rip or petiole e.g:- *Crotalaria juncea*.
• Compound :- A leaf in which the blade in incised upto the mid-rip or petiole into two or more leaflets.
e.g:- *Clitoria ternatea.*

204. Which one of the following anatomical structures is involved in guttation?
(a) Cuticle (b) Hydathodes
(c) Lenticels (d) Stomata

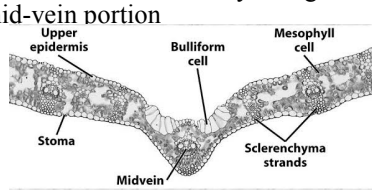
KVPY SA-2019

Ans. (b) : The loss of water in the form of droplets from margins of leaves is called as guttation.
The absorption of water exceeds that of the transpiration due to which, root pressure is increased in xylem and water comes out through hydathodes.

205. Grass leaves curl inwards during very dry weather. Select the most appropriate reason from the following:
(a) Flaccidity of bulliform cells
(b) Shrinkage of air spaces in spongy mesophyll
(c) Tyloses in vessels
(d) Closure of stomata

NEET-2019
DUMET-2011

Ans.(a) : Bulliform Cell - These cells are present in the upper surface of the leaf. They are generally present near the mid-vein portion



206. Match the following with respect to the morphology of the leaf:

(i)	**Simple**	**(p)**	**Zornia diphylla**
(ii)	**Bifoliate**	**(q)**	**Clitoria ternatea**
(iii)	**Trifoliate**	**(r)**	**Lablab purpureus**
(iv)	**Compound**	**(s)**	**Crotalaria Juncea**

(a) s, p, r, q (b) p, q, r, s
(c) p, s, r, q (d) q, r, s, p

SRM JEEE-2019

Ans. (a) : Type of leaf :-
• Simple:- A leaf with one blade which may be entire or incised to any depth but not upto the mid-rip or petiole e.g:- *Crotalaria juncea*.
• Compound :- A leaf in which the blade in incised upto the mid-rip or petiole into two or more leaflets.
e.g:- *Clitoria ternatea.*
• Palmately compound :- Leaflets attached at the tip of the petiole as fingers of a hand.
(i) Unifoliate :- A leaf is reduced to a single terminal leaflet.
(ii) Bifoliate:- A leaf having two terminal leaflets.
e.g :- *Zornia diphylla.*
(iii) Trifoliate:- A leaf having three terminal leaflets.
e.g. :- *Lablab purpureus.*

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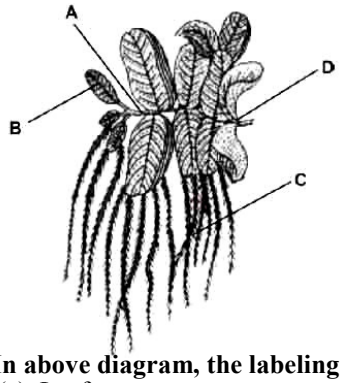
207.



In above diagram, the labeling 'C' is?

(a) Leaf
(b) Intermodal cognation
(c) Third leaf is modified into root
(d) Rhizoid

AIIMS-27.05.2018 Shift-I

Ans. (c) : In the case of *Salvinia* behalf of above mentioned figure (C) is represented as third leaf is modified into root.

• In case of *Salvinia* three leaves are present at one node. Out of these two leaves are normal and third gets modified into adventitious roots which help in floating over the surface of water.

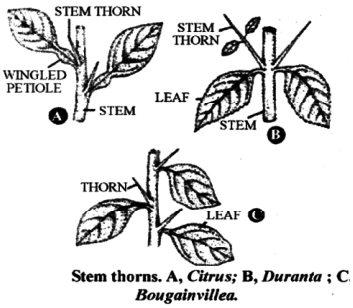
• The given diagram shows *Salvinia* an aquatic fern. The plant body consists of a floating stem bearing two rows of large green leaves on the upper surface and highly branched modified leaf roots on the lower surface.

208. In Bougainvillea thorns are the modifications of:

(a) Stipules (b) Adventitious root
(c) Stem (d) Leaf

NEET-2017

Ans. (c) : Stem gets modified to perform some specialized functions. The axillary bud of the stem is modified into thorns in Bougainvillea to protect them from their enemies.



Stem thorns. A, *Citrus*; B, *Duranta* ; C *Bougainvillea.*

209. A leafy vegetable which has ochraceous stipules

(a) Platanus (b) Amaranthus
(c) Mentha (d) Rumex

AP EAMCET-2002

Ans. (d) : A stipule is an outgrowth borne on both side of a leafstalk base. Membranous tubular stipules that sheath the axillary bud and a past of inter node is called an ochraceous stipule. It is formed by the union of two stipules e.g. :- **Polygonum** and **Rumex.**

210. Which one of the following has thorns, bearing leaves and flowers on them?

(a) Duranta (b) Artabotrys
(c) Carissa (d) Bougainvillea

AP EAMCET-2002

Ans. (a) : Thorns are sharp and stiff which lost their growing point. These are modified stem, leaf or bud structure which contain vascular bundle. Thorns protects the plants from animal and reduce the water loss. Duranta is fast growing evergreen shrub. Their flowers are light blue and its axillary bud is modified into thorns.

211. The leaf less stem of onion which is produced to bear flower is called :

(a) thalamus (b) scape
(c) torus (d) Pedicel

AFMC-2006

Ans. (b) : The leaf less stem of onion which is produced to bear flower is called scape. A scape is a single internode or just the basal internode of a peduncle in a stem without leaves and branches. Peduncle is a part of stem. Onion plants produce a leafless flowering stem which exhibits scape.

212. Unifacial leaves are found in:

(a) Cestrum (b) Allium
(c) Hibiscus (d) Eucalyptus

AP EAMCET-2000

Ans. (b) : Unifacial leaves are found in Allium (onion). Unifacial leaf is a leaf that develops from one side of the leaf primordium only and in consequence has only an encircling adaxial or abaxial epidermis.

• Unifacial leaf is also called as isobilateral or amphistomatic. The epidermis aids in the regulation of gas exchange.

• Stomata are present in upper and lower epidermis of unifacial leaves which are openin through which the exchange of gases takes place.

213. Bract is a modified:

(a) Petal (b) Sepal
(c) Leaf (d) Involucres

Rajasthan PMT-2009
Punjab MET-2009
CMC Vellore-2009

Ans. (c) : A bract is a modified leaf structure found on flower or cones. Bracts are usually different from foliage leaves. They may be smaller, larger or of a different color, shape or texture.

Petal:- Petals are the modified leaves which surround the flower. Petal is a modification of corolla.

Sepal : - Sepals are small leaf shaped green colour and outer most part of the flower. Sepals is a modification of calyx. Sepals provide support to the flower.

214. The following feature, is common in both *Balanophora* and *Casuarina* :

(a) parasitism (b) tree habit
(c) scale leaves (d) phyllode

AP EAMCET-1999

Ans. (c) : Scale leaves is common in both *Balanophora* and *Casuarina*. Scale leaves are small reduced leaves which are also known as cataphylls. It is not a photosynthetic structure but it provides storage function.

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215. Desert grasses often roll their leaves due to presence of:
(a) oily surface (b) bulliform cells
(c) spines (d) Both (a) and (b)
(e) None of the above

CMC Vellore-2010
Punjab MET-2008

Ans. (b) : Desert grasses are monocot and in monocot leaves the epidermal cells are present in the upper surface. They prevent water loss and are responsible for curling up of leaf during water stress. Bulliform cells are types of epidermal cells, which are big sized, thin walled large vacuolated cells that frequently occurs towards the lower epidermis.

216. Which is absent in a leaf?
(a) Lenticels (b) Stomata
(c) Mesophyll (d) Chloroplast

BCECE-2008

Ans. (a) : Lenticels are present in the bark. Lenticels are tiny pores present on the surface of roots and stems. There pores facilitate gaseous exchange between the atmosphere and the plant.
Stomata:- Stomata regulate gas exchange between the plant and environment and control of water loss.
Mesophyll:- Mesophyll cell is present in the leaves
• Hence mesophyll cell of leaves are centres of photosynthesis.
• There are two types of mesophyll cell in leaves palisade and spongy mesophyll.
• Photosynthesis occurs in the chloroplast.

217. The number of stomata present per cm^2 of leaf is:
(a) 1000 to 60000 (b) Less than 100
(c) One million (d) None of these

AMU-2003

Ans. (a) : The number of stomata per cm^2 of a leaf typically falls within the range of 1000 to 60000. This variation is due to factors like plant species, environmental conditions, and the leafs position on the plant. The number of stomata per unit area of leaf is called stomatal frequency. Stomatal frequency of trees and shrubs is higher than those of herbs.

218. Arrange the following plants in the ascending order based on the number of leaflets in a leaf
I. Hardwickia **II. Gynandropsis**
III. Marsilea **IV. Citrus**
(a) I, III, II, IV (b) IV, I, III, II
(c) IV, I, II, III (d) II, IV, III, I

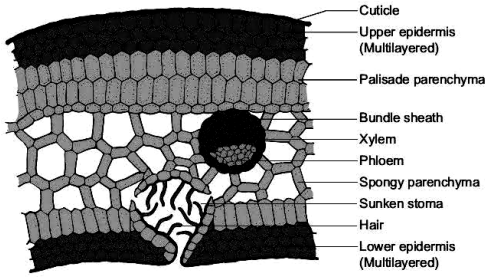
AP EAMCET-2007

Ans. (b) : Ascending order based on the number of leaflets in a leaf of plants is-
Citrus < Hardwickia < Marsilea < Gynandropsis

219. In which of the following plant sunken stomata are found : -
(a) Nerium (b) Hydrilla
(c) Mango (d) Guava

AIPMT-2001
AMU-2009

Ans. (a) : In Xerophytic plant the stomata are sunken as they are located in a Cup-shaped depression (eg:- Nerium). It is an adaptation to reduce the loss of water in xerophytic plants.
• Usually the stomata are placed at the same level as the adjoining epidermal cells (eg:- *Helianthus, Mangifera*).



T.S. of Nerium leaf

220. A compound leaf which appears as simple leaf due to the suppression of one or two leaflets is found in one of the following plants:
(a) Hardwickia (b) Parkinsonia
(c) Coriandrum (d) Citrus

AP EAMCET-2005

Ans. (d) : A compound leaf has a blade which is divided into small leaf like leaflets. Citrus plant contain compound leaf which looks like simple leave due to suppression of its one or two leaflets.
• Coriandrum leaves are alternate compound and most are pinnate or bipinnate.

221. Specific characteristic hydrochasy is stimulated by presence of special cells in upper epidermis of leaf in ?
(a) Mesophytic grasses (bulliform cells)
(b) Xerophytic grasses (bulliform cells)
(c) Halophytes (bulliform cells)
(d) Xerophytes (bulliform cells)

UP CPMT-2014

Ans. (b): Some xerophytic grasses possess specific hydrochasy characteristics. Their leaves contain special bulliform cell in upper epidermis. In xeric condition, due to excess evaporation of water these cells shrinks and roll down itself towards inside and reduce the rate of transpiration. Stomata are now closed and shift inside leaves.
e.g. :- **Ammophila**, **Agropyron**, etc.
• **Mesophytic grasses**– The leaves of mesophytic plants have a variety of leaf shapes, but they are generally flat, thin relatively large, and green in color.
• **Halophytes–** A plant adapted to growing in saline conditions, as in a salt marsh.
• **Xerophytes–** A plant which needs very little water.

222. The modification of petiole, which became specialised structure like leaf and carry out photosynthesis:
(a) Phylloclade (b) Cladode
(c) Phyllode (d) All of these

UP CPMT-2014

Ans. (c): The modification of petiole in leaf like flattened structure in some species of acacia perform photosynthesis. This modification of petiole is carried out due to absence of leaf lamina. This flatened petiole is known as phyllode.

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• **phylloclade**– A phylloclade is a modification stem responsible for photosythesis.
• **Cladode**– Cladode is a form of modified stem, which is green and fleshy in nature.

223. Study the following lists

List I	List II
(A) Entire leaf modified into a spine	**1. Clematis**
(B) Leaf except stipules modified into a tendril	**2. Citrus**
(C) Stipules modified into a tendril	**3. Euphorbia**
(D) First leaf of axillary bud modified into a spine	**4. Lathyrus**
	5. Smilax

The correct match is

	A	B	C	D
(a)	3	4	5	2
(b)	3	1	4	2
(c)	2	3	1	5
(d)	5	2	1	3

AP EAMCET-2009

Ans. (a) : Entire leaf is modified into a spine in the phylloclade of Euphorbia.
• In **Lathyrus aphaca**, whole leaf is modified into tendril. Stipular tendrils are found in Smilax.
• First leaf of axillary bud is modified into spine in citrus.
• In Clematis, the petiole, the rachis and petiolules (stalk of leaflets) get modified into tendrils.
Lathyrus is a plant. People use it as medicine. Despite serious safety concern, **Lathyrus sativus is used in unleavened India bread**. Lathyrus seeds are eaten as food and used as animal fodder.
Euphorbia is a very large and diverse genus of flowering plant.

224. Which is absent in a leaf?
(a) Lenticels (b) Stomata
(c) Mesophyll (d) Chloroplast

UP CPMT-2006

Ans. (a): Lenticels- Leaves do not have lenticels. Lenticels are present in the bark. A lenticel is a tissue having intercellular space. Lenticels are lens-shaped opening in the trunk of woody dicotyledonous plant. It function as pathways for the direct exchange of gases between internal tissue and atmosphere through the bark, which is otherwise impermeable to gases.
• **Stomata-** A stomata, also called a **stomate** is a pore, found in the epidermis of leaves, stems and other organs, that controls the rate of exchange of gasses.
• **Mesophyll-** is the internal ground tissue located between the two epidermal cell layers of the Leaf
• **Chloroplast-** A chloroplast is an organelle within the cells of plants and certain algae that is the site of photosynthesis, which is the process by which energy from the sun is converted into chemical energy for growth.

225. A mature ligule, having prominent basal portion is called:
(a) Glossopodium (b) Rhizophore
(c) Trichome (d) None of these

BHU PMT (Mains)-2006

Ans. (a) : A mature ligule having prominent basal portion is called *Glossopodium*. The ligule is a leaf like structure which is present on the adaxial side of the leaf. The ligule is considered to be secretory organ for keeping the sporangium and young leaves moisture also considered as protective structure of sporangium and leaves.

226. Which of the following two are the resultant of stipule modifications
i. Spines in Ziziphus
ii. Tendrils in Smilax
iii. Tendrils in Nepenthes
iv. Spines in Argemone
v. Thorns in Bougainvillea
(a) i, iii (b) i, ii
(c) ii, v (d) iii,v

AP EAMCET-2008

Ans. (b) : Stipule is usually visible as an outgrowth that is borne on either side of the stalk. Modification of stipules are called as **stipular modification**. Zizyphus is a spiny shrub. In this, the stipules are modified into Spines. They help in protection of the plant. In Smilax, the stipules are modified into tendrils, used as climbing tendrils.

227. The bladders of Utricularia and pitchers of Nepenthes are modification of:
(a) stems (b) leaves
(c) roots (d) flowers

J&K CET-2004

Ans. (b) : The bladders of utricularia and pitchers of Nepenthes are modification of leaves. Nepenthes also called tropical pitcher plant or monkey cup. Pitcher plant the leaf of the pithcer plant is modified into a trapping device that looks like a pitcher.

228. The most common type of compound leaves occurring in nature are
(a) Bipinnate (b) Tripinnate
(c) Trifoliate (d) Decompound

UP CPMT-2013

Ans. (d) : The most common type of compound leaves occurring in nature are decompound. Leaf lets of several distinct part. The best example of this type of leaf is coriander.

229. Stipules remain persistent throughout the whole life of the leaves in:
(a) Michelia (b) Cassia
(c) Hibiscus (d) Oryza

UP CPMT-2013

Ans. (c) : Stipules remain persistent throughout the whole life of the leaves in Hibiscus. Stipules are foliar appendages at the base of the leaf sheath or hypo podium that are often paired and some times leafy.

230. Bulliform cells are found in upper epidermis of :
(a) cladodes (b) phylloclades
(c) monocot leaf (d) dicot leaf

BVP-2000
AIIMS-1995
Rajasthan PMT-2001

Ans. (c) : Bulliform cells are found in upper epidermis of monocot leaf. The vascular structures of monocot leaf from parallel veins. Monocot leaf differs from dicot leaves in several ways.

@apna_pdf

231. Perianth is represented by:
(a) glumes (b) lemma
(c) lodicules (d) palea

UP CPMT-2009
Punjab MET-2009
AP EAMCET-2011

Ans. (c) : Perianth is represented by lodicules. The perianth is the outer part of a flower that includes the calyx (sepals) and corolla (Petals).
• In family Gramineae (or poaceae), the perianth is represented by membranous scales called lodicules. The lodicules are situated above and apposite the superior palea.

232. In gloriosa, the tendrillar part is formed by:
(a) leaf petiole (b) stipule
(c) axillary bud (d) leaf apex

AIIMS-1996

Ans. (d) : In gloriosa, the tendrillar part is formed by leaf apex. Gloriosa are herbaceous perennials that climb or scramble over other plants with the aid of tendrils at the end of their leaves and can reach 3 meters in hight.

233. What type of sorus is present in Nephrolepis?
(a) Coenosorus (b) Simple
(c) Mixed (d) None of these

AIIMS-2011

Ans. (c) : In **Nephrolepis mixed sorus** is present because without any order of development sporangia arise. Sorus is a special structure and the outgrowth of the leaf helps in providing protection to the sporangia. In it the young and old sorus are indiscriminately mixed.

234. A leaf is identified by:
(a) flat green lamina
(b) presence of axillary buds
(c) presence of leaf blade and petiole
(d) none of the above

J&K CET-2000

Ans. (b) : A leaf is identified by flat green lamina. A broad expanded blade (the lamina) attached to the plant stem by a stalk like petiole. The axil of the leaf is the upper angle between the leaf and the stem. Structures located there are called axillary. It is often the location of a bud so that bud is known as axillary bud.

235. Leaves of grasses roll and unroll due to:
(a) hormonal change
(b) change in temperature
(c) change in turgor pressure
(d) presence of bulliform apparatus

JCECE-2006

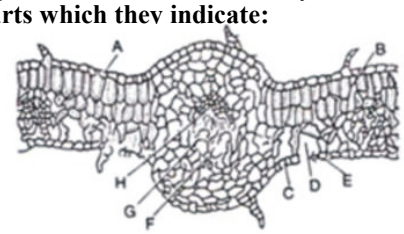
Ans. (d) : Leaves of grasses roll and unroll due to presence of bulliform apparatus. Bulliform cells are a group of large parenchyma cells that specifically exist on the upper surfaces of leaves of many monocots.

236. Leaves arise from which part of plant?
(a) Rhizome (b) Stem
(c) Internode (d) Node

AFMC-2003

Ans. (d) : Nodes are the points on a stem from which the buds and leaves arise. The distance between two nodes is called internode. A stem is a structural axis of a vascular plant, it support leaves, flowers and fruits, transports of water and other substance.
• Rhizome is a modified stem and horizontal underground plant stem capable of producing the shoot and root system of a new plant.

237. In the diagram of the portion of the TS of Helianthus leaf passing through the midrib given below, certain parts have been indicated by alphabets, choose the answer in which these alphabets have been correctly matched with the parts which thev indicate:



(a) A = Epidermis, B = Spongy parencyhyma, C = Palisade parenchyma, D = Stomata, E = Guard cells, F = Phloem.
(b) A = Epidermis, B = Palisade parenchyma, C = Spongy parenchyma, D = Sub - stomatal cavity, E = Guard cells, F = phloem, G = Metaxylem, H = Protoxylem,
(c) A = Epidermis, B = Palisade parenchyma, C = Spongy parenchyma, D = Stomata, E = Guard cells, F = Endodermis, G = Xylem, H = phloem,
(d) A = Epidermis, B =Palisade parenchyma, C = Spongy parenchyma, D= Stomata, E = Guard cells.

Karnataka CET-2001

Ans. (b) : Dicotyledonous leaves usually rounded with reticulate venation which be distinguished from monocotyledonous leaves in their structure and anatomy. A Typical dicot leaf consists of a leaf blade which is additionally called the lamina. The lamina is that the widest part of a leaf. In the dicot leaf, we have, Epidermis, Palisade parenchyma, spongy parenchyma, Sub-stomatal cavity, stomata, Phloem, ,Metaxylem and protoxylem.

238. Storage leaves occur in:
(a) Allium (b) Zizyphus
(c) Tricicum (d) Trapa

WB JEE-2007

Ans. (a) : Storage leaves occur in allium. Allium is a genus of monocotyledonous flowering plants with hundreds of species one loding the cultivated onion, garlic, scallion, shallat, leek, and chives. The generic name allium is the latin word for garlic and the type species for the genus is *Allium sativum* which means "cultivated garlic".

239. Two chief functions of the leaves are:
(a) photosynthesis and respiration
(b) photosynthesis and transpiration
(c) transpiration and respiration
(d) respiration and digestion

WB JEE-2007

Ans. (b) : The main function of leaves are photosynthesis, a leaf is to produce food for the plant by photosynthesis chlorophyll, the substance that gives plants their characteristic green color, absorbs only energy.
In actively growing plants, water is continuously evaporating from the surface of leaf cells exposed to air. This water is replaced by additional absorption of water

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from the soil. Liquid water extends through the plant from the soil water to the leaf surface where it is converted from a liquid into a gas through the process of evaporation.

240. The leaves of some plants contain crystals of calcium carbonate in epidermal cells, giving appearance that of bunch of grapes are called:
(a) cystoliths (b) sphaeraphides
(c) raphides (d) otoliths
MGIMS Wardha-2015
Rajasthan PMT-1997,2001

Ans. (a) : The leaves of some plants contain crystals of calcium carbonate in epidermal cells, giving apperance that of bunch of grapes are called cystoliths. Calcium carbonate crystals have been reported from within the cells of banyan leaf and some members of families *Acanthaceae, cucurbitaceae, utricaceae* etc. Some cells contain star-shaped aggregation of crystals of calcium oxalate which are known as sphaeraphides.
Raphide is needle-shaped crystals calcium oxalate.
Otolith is granule of calcium carbonate in vertebrates inner ear.

241. In tamarind, the pinnate leaf is:
(a) bipinnate (b) tripinnate
(c) paripinnate (d) imparipinnate
Punjab MET-2011

Ans. (c) : In tamarind, the pinnate leaf is peripinnate. The tamarined leaf is the leaf of a tall shade tree native to Asia and Northern Africa and widely grown in India. Paripinnate leaf- Evenly paired pinnate leaves, the leaf lets are arranged in an opposite manner and rachis ends with two leaflets.

242. Match entities of List I with List II

List I	List II
(A) Bulliform	**(1) Stomata**
(B) Guard cells	**(2) Aerating pore**
(C) Lenticel	**(3) Accessory cells**
(D) Subsidiary	**(4) Isobilateral leaf**

(a) A-4 B-1 C-2 D-3
(b) A-1 B-4 C-2 D-3
(c) A-4 B-2 C-3 D-1
(d) A-1 B-2 C-3 D-4
Manipal-2014

Ans. (a) :
(A) Bulliform → Isobilateral leaf
(B) Guard cells → stomata
(C) Lenticel → Aerating pore
(D) Subsidiary → Accessory cells

243. Leaf blade is spinous in case of :
(a) Nerium (b) Ziziphus
(c) Argemone (d) Cannabis
Manipal-2005

Ans. (c) : Leaf blade is spinous in case of argemone. Argemone is a genus of flowering plants in the family papaveraceae commonly known as prickly poppies.
• These protect the plant from grazing animals and reduce the rate of transpiration in xerophytic plants.

244. Leaf lamina is modified into two toothed jaws in:
(a) Nepenthes (b) Dionaea
(c) Drosera (d) Utricularia
Haryana PMT-2001

Ans. (b) : Leaf lamina is modified into toothed jaws dionaea. It lamina is modified into two toothed jaws and form a trap.
• Dionaea muscipula commonly called venus fly trap, is perhaps the best known of the carnivorous plant species on earth.

245. The synthesis of florigen occurs in:
(a) Root (b) Leaf
(c) branch (d) Stem
Rajasthan PMT-1995

Ans. (b) : Florigen is systemically mobile signal that is synthesized in leaves and transported via the phloem to the shoot apical meristem (SAM) where it initiates flowering.

246. Thigmotropism is best observed in:
(a) Roots (b) Leaves
(c) Tendrils (d) Stems
BHU PMT (Screening)-2005

Ans. (c) : Thigmotropism is typically found in twining plants and tendrils, however plant biologists have also found thigmotropic responses in flowering plants and fungi. This behaviour occurs due to unilateral growth. Inhibition.

247. Heterophylly of Limnophila is
(a) Environmental (b) Developmental
(c) Habitual (d) Adaptive
BHU PMT (Mains)-2007

Ans. (d) : Heterophylly of limnophila is adaptive. Heterophylly is the development of different leaf forms in a single plant depending on the environment condition. It is usually 3 types- habitual heterophylly, Developmental, environmental.

248. I. Pulvinus leaf base is present in some leguminous plants.
II. Whorled phyllotaxy is seen in Calotropis.
III. In Australian acacia, the petioles expand, become green and synthesise food.
IV. A bud is present in the axil of leaflets of the compound leaf.
Of the above statements
(a) I and IV are correct but II and III are wrong.
(b) II and III are correct but I and IV are wrong.
(c) I and III are correct but II and IV are wrong.
(d) III and IV are correct but I and II are wrong.
(e) II and IV are correct but I and III are wrong.
Kerala PMT-2013

Ans. (c) : I and III are correct but II and IV are wrong. The swollen leaf base is called a pulvinus. It regulate the movement of leaf in plant, usually present in the leguminous plant. The arrangement of leaves on the stem or branch of plant is called phyllotaxy, whorled phyllotaxy found in Alstonia and Nerium.
In calotropis opposite phyllotaxy is present. A bud is present in the axil of petiole of simple and compound leaves. It is not present in the axial of leaf lets of compound leaf.

249. Cuticle is secreted by:
(a) epidermis (b) endodermis
(c) both (a) and (b) (d) hypodermis
Rajasthan PMT-2005

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Ans. (a) : Cuticle is secreted by epidermis. In some higher plants the cuticle is a water impervious protective layer covering the epidermal cells of leaves and other parts and limiting water loss due to their waxy secretion.

250. Leaf tendrils are found in:
(a) peas (b) cucumber
(c) grape vines (d) all of theses

AMU-2015

Ans. (a) : Stem tendrils develop from the axillary buds.
• The tendrils are modified stem or leaf that has thread like shape which provides support to the climbing plant. A leaf tendril in peas are actually modified leaves that emerges through a leaf and it has wiry and coiled structure that surrounds and supports plant.

251. The spines of cacti are modified:
(a) scales (b) stems
(c) leaves (d) petioles

UP CPMT-2010

Ans. (c) : The spines of cacti are modified leaves. Most species of cacti have spines. It helps to prevent water loss. Spines are highly modified leaves that protect the plant from herbivores, radiate heat from the stem during the day.

252. The type of leaf in *Daucus carota* is :
(a) simple (b) bipinnate
(c) tripinnate (d) decompound

Uttarakhand PMT -2004
AMU -2005
Manipal-2004

Ans. (d) : Decompound type of leafs found in *Daucus carota.* The leaf rachis divided or more then three times and gives rise to small axis on which leaflets are arranged.
Example of this type of leaves are Parthenium, Coriander, Fennel etc.

253. Thick cuticle on the leaves are typical of plants growing in
(a) wet habitats (b) warm habitats
(c) dry habitats (d) cool habitats

BHU PMT (Mains)-2009

Ans. (c) : Thick cuticle on the leaves are typical of plants growing in dry habitats. The cuticle is the thick waxy coating present on leaf, which reduces the transpiration rate at high temperature so these plants belonging to dry region.

254. Which is correct match ?
(1) Opuntia - bulb
(2) Asparagus - cladodes
(3) Ruscus - phylloclade
(4) Citrus - stem thorns
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (c) : Asparagus is example of cladodes and citrus is example of stem thorns.
Asparagus : cladodes are green photosynthetic stems that are generally one internode long.
The true leaves of the plants are reduced to scales or spines.
Citrus : Sometimes thorns are present in axil of the leaves or apex of stem. There are modified stem that perform the function of defence.

255. In Kalanchoe, the epiphyllous buds producing roots occur on :
(a) leaf margin only
(b) leaf margin and stem
(c) leaf petiole and stem
(d) leaf surface only

BHU PMT (Mains)-2005

Ans. (a) : In kalanchoe, the epiphyllous buds producing root occur on leaf margin only.
These buds are known as the Epiphyllous buds. This buds detach from the leaves and fall on the soil and grow into new plant.

256. Which one is a correct match about leaf modification?
(1) Fleshy leaves? Aloe, Agave, sedum
(2) Bladder? Utricularia stellaris
(3) phyllode ? Acacia , parkinsonia
(4) leaf spine ? cucurbica
(a) 1,2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (a) : Fleshy leaves: plants with fleshy leaves are called succulents and are usually found in areas like deserts there leaves are green and fleshy because they store water in them. ex- *Aloe, Agave, sedum.*
Leaf Bladder : The segments of the leafs are modified in bladders. These plants are found into water the inner wall is provided with digestive gland which helps in digesting the trap insect. ex- *Utricularia stellaris*
Phyllode : In some plant, petiole becomes flattened and it becomes like a leaf and green in colour are known as phyllode ex-*Acacia, parkinsonia* leaf.
Spine : leaf spines reduce water loss due to transpiration. There leaf modified into needle like structure which is known as spine. Ex. *Opuntia*

257. The leaves are modified into pitcher in:
(a) Drosera (b) Aldrovanda
(c) Sarracenia (d) Utricularia

BHU PMT (Mains)-2011

Ans. (c) : The leaves are modified into pitcher in *sarracenia*, also called trumpet pitchers.
Leaves of *sarracenia* has the largest pitcher. In pitchers the leaves are usually modified to form pitfall traps, this type of modification is observed in a pitcher plant.

258. In which of the following plants, leaf apex changes into tendril?
(a) Gloriosa (b) Smilax
(c) Pisum sativum (d) Australian Acacia

AFMC-2002
Manipal-2012

Ans. (a) : Leaf tips are modified into tendrils in *Gloriosa superba*. It is an angiosperm plant classified as monocot. There tendrils wrap around surrounding plants for support.
They also helps in attachment, support and cellular invasion of other plants.

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259. The leaves without petiole are called:
(a) lamina (b) rachis
(c) petiolate (d) sessile
AMU-2011

Ans. (d) : A leaf without petiole is called sessile leaf. In that case, leaves or leaflet directly attach to the stem (without stalk). This kind of leaves known as apetiolate. Ex. *Oryza* (Rice)

260. Find the correct match.
(a) Mustard plant - Leaves are opposite
(b) Mustard plant - Leaves are alternate
(c) Guava plant - Leaves are alternate
(d) Guava plant - Leaves are whorled
AMU-2010

Ans. (b) : Leaves are important in plant as they make food by photosynthesis. Mustard plant have alternate leaf which are branched, petiolate, long and hairy on both sides, Example of Alternate phyllotaxy are china rose, sunflower.
Guava leaf are oval in shape the leaves grow in an opposite arrangement and have short petioles that join the leaf to the stem.

261. Goldfussia in which two different size of leaves are found is an excellent example of:
(a) Heterophylly (b) Anisophylly
(c) Distichous (d) None of these
AMU -2000

Ans. (b) : Anisophylly (The occurrence of two sizes of leaves). Anisophylly is term commonly referred to explain plant having pairs of leaves with the significant difference in their size between two leaves. Ex. Goldfussia *(Strobilanthes anisophyllus)*,Glomerata etc.
Heterophylly is the development of different leaf forms in a single plant depending on the environmental condition. Ex. ficus, Artocarpus
Distichous phyllotaxy, also called two ranke leaf arrangement.

262. Insectivorous plants usually survive in:
(a) water rich soil
(b) N_2 deficient soil
(c) N_2 rich soil
(d) sugar deficient medium
Manipal-2000

Ans. (b) : Insectivorous plants are also called carnivores plant, they are known as pitcher plants. They are grown in a regions where nitrogen deficient in soil and fulfill their nitrogen requirement by trapping small insects.

263. Swollen and spongy petioles are characteristic of:
(a) Trapa (b) Wolffia
(c) Ceratophyllum (d) Limnophila
AP EAMCET-2003

Ans. (a) : Swollen and spongy petioles keeps the water hyacinth plants float. They are commonly name as water chestnut. When filled with air provides the buoyancy to the water hyacinth so that it can float above the water without any support.

264. Exstipulate leaves are present in:
(a) Althea rosea
(b) Tridax procumbens
(c) Hibiscus rosa-sinensis
(d) Tephrosia purpurea
AP EAMCET-2003

Ans. (b) : Leaves of some plants have two lateral appendages on either side of the leaf base known as stipules. The stipules are most commonly present in dicot plants. Very few monocot plants posses stipules.
Leave without stipules is called an ex-stipulate leaf. Ex. Solanaceae.
Exstipulate leaves are present in *Tridax procumbens*. It belongs to the family Asteraceae.

265. Modification of petiole into leaf like structure is called:
(a) cladode (b) phylloclade
(c) phyllode (d) pistillode
BVP-2013
CG PMT-2009
Haryana PMT-2009

Ans. (c) : Phyllode is a modified petiole that has become flattened and green to perform the functions of a leaf. It is a xerophytic adaptation.
Its main function is to reduce the rate of transpiration.

266. Flowers and lateral branches arise from the:
(a) lateral buds (b) Lenticels
(c) Stomata (d) Cuticle
HP CET-2012

Ans. (a) : Lateral buds are those which occur on the side of stems, it's called axillary buds. The flower and lateral branches usually develops as a branch from a bud growing in the axil of a small leaf like structure known as bract, such buds are known as lateral buds.

267. Identify the wrong expression from the following statements:
(a) A plant that bears male, female and bisexual flowers is polygamous.
(b) An actinomorphic flower can be dissected into two equal haves from any place.
(c) Superior ovary is found in hypogynous flowers.
(d) That side of the flower towards the bract is called the posterior side.
AP EAMCET-2005

Ans. (d): Bract is considered a modified leaf. It bears a peduncle or petiole in its axile. Bract occurs towards the anterior side of a flower while mother axis or floral axis of a flower occurs towards the posterior side. The branch bearing flower is called as the mother axis.

268. Opening of flower is an example of :
(a) Spontaneous movement
(b) Hyponastic movement
(c) Epinastic movement
(d) Cleistogamous movement
UPCPMT-2002

Ans. (c): Epinastic movements are generally observed in leaves, flowers, petals and buds. In these structures at some stage of development, growth in one surface is more than the growth on the other surface. There is two types a movement-epinasty and hyponasty.
■ A nastic movement in which a plant part such as a flower petal is bent outward and often down ward. An example for epinasty is the opening of a flower and the drooping of a bud.
■ In hyponastic movement, there will be more growth on the lower surface of sepals and petals, the flower will close.

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E. Venation and Phyllotaxy

269. Circinate vernation is found :
(a) Cycas (b) Fern
(c) Both (a) and (b) (d) None of these
CG PMT-2007
BVP-2013
MGIMS Wardha-2004
UPCPMT-2002

Ans. (c) : Circinate vernation is a type of vernation in which a fern frond is produced. It is tightly curled and it has a tender growing tip. There is a coil in which the growing tip is protected. Circinate refers to leaves or fronds are rolled up with the tip in the centre.
These type of vernation is found in Cycas and fern.

270. The reason for the similar size of vascular bundles in Monocot leaf
(a) Modification of epidermal cells
(b) mesophyll
(c) Bundle sheath
(d) Parallel venation
AP EAPCET-22.05.2023, Shift-I

Ans. (d) : The main different between monocot and dicot leaf is Parallelvenation found in monocot leaf while Reticulate venation found in dicot leaf Parallel venation may be divergent such as Banana and convergent type like rice, Maize, Sugarcane etc.
The parallel venation is main reason for the similar size of vascular bundles in monocot leaf.

271. Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.
(a) Epiphyllous and Dithecous anthers
(b) Diadelphous and Dithecous anthers
(c) Polyadelphous and epipetalous stamens
(d) Monoadelphous and Monothecous anthers
NEET (UG) 07.05.2023

Ans. (b) : Diadelphous when stamens are united Partially and are present in two bunches, they are called diadelphous. Ex Pea.
- Diadelphous condition is the characteristics feature of fabaceae family.
- Swallen placenta persistent Calyx is the characteristic feature of solanaceae family.
- Liliaceae family is a monocot family

272. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by
(a) Henking
(b) Thomas Hunt Morgan
(c) Sutton and Boveri
(d) Alfred Sturtevant
NEET (UG) 07.05.2023

Ans. (d) : Alfred Sturtevant used the frequency of recombination between gene pair on the same chromosome as a measure of the distance between genes and mapped their position on the chromosome.
- Alfred Henry Sturtevant was an American geneticist conducted the first genetic map on a chromosome in 1911. He worked with Thomas hunt Morgan on the organism *Drosophila melenogaster.*

273. The pattern of arrangement of leaves on the stem is known as:
(a) heterophylly (b) phyllode
(c) phyllotaxy (d) phylloclade
J&K CET-2014

Ans. (c) : The pattern of arrangement of leaves on the stem or branch is known as **phyllotaxy**. This is usually of three types- alternate, opposite and whorled.

274. 120° phyllotaxy is found in:
(a) tristichous (b) pentastichous
(c) distichous (d) octastichous
Manipal-2015

Ans. (a) : 120° phyllotaxy is found in tristichous. In tristichous phyllotaxy, there are three leaves in one spiral.
The mode of arrangement in the 1st, 4th, 7th and 10 th leaf remains in one row while the 3rd, 6th, 9th and 12th in the second row and 2nd, 5th, 8th and 11th are in the third row. For ex. *Cyperus rotundus*.

275. Which of the following shows both opposite decussate and opposite superposed phyllotaxy?
(a) Psidium (b) Quisqualis
(c) Calotropis (d) Ixora
AP EAMCET-2001
VMMC-2014

Ans. (a) : When successive pair of leaves placed at right angle (90°) of preceding pair of the leaves and there are four vertical rows.
Example : - Calotropis, ocimum
Opposite superposed - The successive pair of leaves are placed in vertical plane of the preceding pairs of the leaves and there are two vertical rows.
Example:- Guava, Jamun (*Eugenia jambulina*)
- In the Guava (*Psidium*) horizontal branches have superposed and vertical branches shows decussate opposite phyllotaxy.

276. Circinate vernation in leaves is caused due to:
(a) epinasty (b) hyponasty
(c) apostrophe (d) None of these
BHU PMT (Screening)-2011

Ans. (b) :
Hyponasty - The hyponasty is an upword folding or untwisting of leaves that results from greater lower side growth which helps to cool the leaves. Because of hyponasty circinate ptyxis is present only in fern leaves.

277. Alternate phyllotaxy in which the sixth leaf lies above the first leaf after completing two circles is known as:
(a) distichous (b) tristichous
(c) pentastichous (d) octastichous
AP EAMCET-2002
AMU-2008
VMMC-2008

Ans. (c) : Phyllotaxy is defined as the arrangement of leaves or mature leaves on branches or the stem in a distinct pattern. Pentastichous phyllotaxy is also called as 2/5 phyllotaxy. It is seen in Hibiscus. In this the sixth leaf base lies above the first one after completing two circles similarly the seventh leaf base lies above the second leaf base.

278. The leaves of *Smilax* and *Colocasia* show:
(a) parallel vernation (b) reticulate vernation
(c) forward vernation (d) lateral vernation
Haryana PMT-2003

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Ans. (b) :
Reticulate vernation - Leaves of monocot plant shows parallel vernation and dicot leaves shows reticulate vernation. However there are exception in monocots like smilex and colocasia they show reticulate vernation.
In reticulate vernation veins are arranged in the form of a network on the surface of the lamina.

279. Which one of the following plants exhibits an example of anisophylly, where the different size of leaves are present in opposite phyllotaxy?
(a) *Ranunculus aquatilis*
(b) *Gold fussia*
(c) *Limnophila heterophyllum*
(d) *Vallisneria spirilis*

AMU-1996
AMU -2000
AMU-1995

Ans. (b) : *Ranunculus aquatilis* is aquatic plant, growing in mats on the surface of water .
• **Goldfussia** is an example of anisophylly, where the different size of leaves are present in opposite phyllotaxy generally the opposite leaves of a plant are of the same size.
• Limnophila heterophyllum is marsh weed light green leaves contrast.

280. Whorled, simple leaves with reticulate venation are present in :
(a) Alstonia (b) Calotropis
(c) Neem (d) China Rose

AIPMT (Mains)-2011
NEET (Odisha)-2019

Ans. (a) : Whorled simple leaves with reticulate venation are present in Alstonia.
• In leaves of **Alstonia** are simple elliptical or ovate linear to lanceolate and wedge-shaped at the base these are leathery and sessile. The leaf blade is dorsiventral and arranged in a whorl with the entire margin.
• The leaf venation is pinnate, with numerous veins ending in a marginal vein.

281. How many plants among China rose, Ocimum, sunflower, mustard, Alstonia, guava, Calotropis and Nerium (Oleander) have opposite phyllotaxy?
(a) Two (b) Three
(c) Four (d) Five

NEET (Karnataka)-2013

Ans. (b) : The pattern and arrangement of leaf, on stem or branch of plant is called Phyllotaxy.
• Ocimum, Guava and Calotropis have opposite phyllotaxy
• China rose, sunflower, grass, Mustard shows alternate phyllotaxy
• Alstonia, Hydrilla, Nerium (Oleander) show whorled phyllotaxy.

282. Identify the pair that exhibit 'Circinate vernation''.
(a) Equisetum and Selaginella
(b) Psilotum and Riccia
(c) Riccia and Nephrolepis
(d) Nephrolepis and Cycas

Karnataka CET-2010

Ans. (d): Nephrolepis and Cycas exhibit circinate vernation. Circinate vernation is the manner in which the frond emerges, as the fern frond is tightly curled so that the tender growing tip of the fronds is protected within a coil. The fronds unwind from the tightly coiled structure that was formed in the overwintering bud.

283. Identify the wrong statement:
(a) Stipules in *Lathyrus* are persistent.
(b) Phyllotaxy in *Trillium* is alternate.
(c) Venation in *Caulophyllum* is parallel.
(d) Caulline leaves are found in Cocos.

AP EAMCET-2013

Ans. (b) : Phyllotaxy-In Trillium is alternate is wrong answer because-
In alternate phyllotaxy, consecutive leaves are produced in a spiral manner around the stem. This is seen in rose plant.
(a) Stipules in *Lathyrus* are persistent- The stipules remain attached to the leaf for the entire life of the leaf. In Lathyrus, the stipules are present in the form of large leaf.
(c) Venation is the arrangement of veins on the leaves. It is either parallel or reticulate. In Calophyllum, the venation is parallel.
(d) Leaves arising from the main stem are called cauline leaves. Example include rose, cocos, maize.

284. Identify the correct pair of combinations :
(I) Vallisneria - Long stalked female flowers - Hydrophily
(II) Tribulus - Annual - Root succulent
(III) Hydrilla - Submerged rooted hydrophytes - Aerenchyma
(IV) Casuarina - Perennil - Phylloclades
(a) (III, IV) (b) (II, III)
(c) (I, IV) (d) (I, III)

TS EAMCET-2015

Ans. (c) : Correct pair of combinations is-
(1) Vallisneria → long stalked female flowers hydrophily.
(2) Casuarina → Perennial - Phylloclades.

285. Multicostate parallel type of venation is found in the leaves of
(a) Grasses and palms
(b) Banana and Canna
(c) Castor and china Rose
(d) Mango and Peepal
(e) Castor and Tapioca

Kerala PMT-2009

Ans. (a) : Multicostate parallel type of venation is found in the leaves of Grasses and palms.
It refers to presence of more than one principal vein. It is two type- Convergent, Divergent.

286. The reticulate venation is commonly found in the leaves of :
(a) monocot plants (b) dicot plants
(c) bryphytes (d) thallophytes

J&K CET-2005

Ans. (b) : The reticulate venation is commoly found in the leaves of dicot plant. The dicotyledons, also known as dicot plants.

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287. Among flowers of Calotropis, Tulip, Sesbania, Asparagus, Colchicine, Sweet pea, Petunia, Indigofera, Mustard, Soyabean, Tobacco and groundnut how many plants have corolla with valvate aestivation?

(a) Five (b) Six
(c) Seven (d) Eight

NEET (Karnataka)-2013

Ans. (c) : • Family Solonaceae and Liliaceae, Valvate aestivation are present.
• Family Fabaceae, vexillary aestivation are present. Valvate Aestivation is found in calotropis, Tulip, Asparagus, Colchicine, Petunia, Mustard, Tobacco.
• Vexillary aestivation is found in Sweet pea, Groundnut, Soyabean, Indigofera and Sesbania.

F. Inflorescence and its type

288. Catkin inflorescence is characteristic of

(a) Morus (b) Triticum
(c) Ficus (d) All of these

MGIMS Wardha-2011
Haryana PMT-2011
Rajasthan PMT-2011
JIPMER-2011

Ans. (a) : Catkin inflorescence is similar to spike, floral axis becomes thin and weak.
Unisexual inflorescence, usually deciduous and usually drop down like pendulum except - **Salix (willow)**
Example:- *Morus alva* (mulberry), oak, etc.

289. The part of cauliflower which is eaten is:

(a) flower (b) inflorescence
(c) fruit (d) leaf

Assam CEE-2014
AFMC-2005
Uttrakhand-2005
AIIMS-2000
Rajasthan PMT-1995

Ans. (b) : Compound corymb –It is a modified raceme with relatively a short main axis, in which the lower flowers have much elongated pedicels so that the flowers come to the same level. Typical example - **Cauliflower**

290. Floral formula of Allium cepa

(a) Br Ebrl ⊕ ♀ $P_{(3+3)}$ A_{3+3} $\underline{G}_{(3)}$
(b) Br Ebrl ⊕ ♀ $P_{(3+3)}$ A_5 $\underline{G}_{(3)}$
(c) Br Ebrl ⊕ ♀ P_5 A_{3+3} $\underline{G}_{(3)}$
(d) Br Ebrl ⊕ ♀ P_6 A_6 $\overline{G}_{(3)}$

TS EAMCET 10.05.2023 Shift-I

Ans. (a) : The floral formula of Allium cepa.

Br Ebrl ⊕ ♀ P_{3+3} A_{3+3} $G_{(3)}$

The Allium cepa belong in the family Liliaceae the Liliaceae have 16 gerera and 635 species the Liliaceae family usually have six segmentaed flower and three chambered capsular fruits occasionally the fruits are barriers.
The leaves are cluster at the base of the plant but many alternate along the stem or be arranged in whorls.

291. Chromosome with the fewest genes in human beings is

(a) X - chromsome (b) Y - chromosome
(c) Chromosome - 1 (d) Chromosome - 21

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : • Y-chromosom in human have fewest genes about 231 gene.
• Y and X - Chromosomer are sex chromosomes.
• Male have X and Y chromosomes while female have X and X chromosomes.
• On the chromosomes 21 disorder is cause down syndrome.

292. Which of the following plant examples are wrongly paired with their type of inflorescence.
A. Hamelia and Solanum – Dichasial cyme
B. Bougainvillea and Jasmine – Cymule
C. Hibiscus and Datura – simple Raceme
D. Cauliflower and Cassia – corymb
E. Achyranthes and Grass – Umbel

(a) A, B & D (b) A, C & E
(c) C, D & E (d) B, C & D

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : (B) • Bougainvillea inflorescence is branched axillary or terminal panicles.
• The inflorescence of Jasmine is cymose clusters.
(C) • Hibiscus inflorescence type of solitary cyme.
• The inflorescence in the Datura flower is a dichasial cyme.
(D) • The inflorescence of Cauliflower is compound corymb.
• The Cassia inflorescence an axillary, pendulous, Lax receme, 20-40(–60) cm long, many flowered.

293. Identify the plants based on the given characters in sequence.
(A) Peduncle is unbranched.
(B) Flowers appear to have arisen from the same point.
(C) The main axis continues to grow.

(a) Datura – Carrot – Crotalaria
(b) Carrot – Crotalaria – Datura
(c) Cocos – Tridax – Carrot
(d) Cocos – Crotalaria – Carrot

TS EAMCET-31.07.2022 Shift-II

Ans. (a) : Datura peduncle is unbranched because peduncle terminates into a single flower and there is no further development at floral branches in carrot flowers appear to have arisen from same point and the main axis continues to grow in crotalaria.

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294. Choose incorrect statement:

(a) Hypanthodium of ficus has irregularly arranged flowers
(b) Head inflorescence of sunflowers has centrifugally arranged flowers
(c) Racemose inflorescence of crotalaria has its flowers arranged in acropetal order
(d) Cymose of Jasmine has basipetally arranged flowers.

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Simple racemose inflorescence is that indefinite inflorescence in which the peduncle is un-branched. Caesalpinia is an example of racemose inflorescence in a flowering plant, a cluster of flowers on its branches is called an inflorescence.
Acropetal order means that flowers at the bottom are older than the ones on the top. Flowers can also be seen arranged in a centripetal order.

295. Match the following :

	List-I		List-II
(A)	**Solitary cyme**	**(I)**	**Ipomoea**
(B)	**Monochasial cyme**	**(II)**	**Bougainvillea**
(C)	**Polychasial cyme**	**(III)**	**Datura**
(D)	**Dichasial cyme**	**(IV)**	**Solanum**
(E)	**Cymose**	**(IV)**	**Nerium**

The correct match is
Options:

	A	B	C	D	E
(a)	III	IV	I	V	II
(b)	III	I	IV	V	II
(c)	II	V	III	IV	I
(d)	III	IV	V	I	II

TS EAMCET-30.07.2022 Shift-I

Ans. (d) :

A.	Solitary →	Datura
B.	Monochasial cyme →	Solanum.
C.	Polychasial cyme →	Nerium
D.	Dichasial cyme →	Ipomoea
E.	Cymose →	Bougainvillea

296. Identify the inflorescence in which the flowers arise from same point of the peduncle and covered by a whorled of Bracts?

(a) Spike (b) Head inflorescence
(c) Corymb (d) Umbel

AP EAPCET-12.07.2022 Shift-I

Ans. (d) : Umbel- Flower arising from one point due to condensation of axis, with oldest flower the center as in family - ***Apiaceae.***
• Compound umbel has branching bearing crowded sessile flower as in ***Acasia*** and ***Mimosa.***

297. Find the wrong statements among the following

(A) In cyathium bisexual, achlymadeous flowers are present
(B) If calyx and corolla are not distinct they are called perianth
(C) In nut, pericarp is stony
(D) The thin membranous structure in the axil of leaf is called bracteole

(a) A, C (b) B, D
(c) A, D (d) B, C

TS EAMCET-10.08.2021 Shift-I

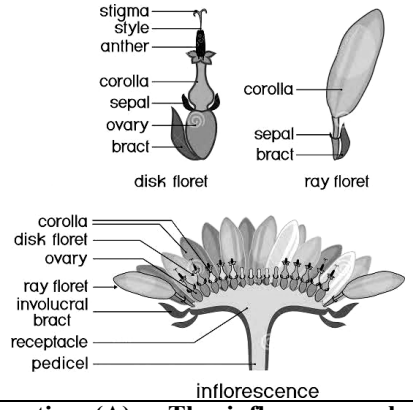
Ans. (c) : Bracteole is a small leaf like structure which is subtends a flower or inflorescence. The stalk of the bracteole is itself sustended by a bract. A bract is a leaf like structure from the axile out of which can grow a flower.
• **Cyathium** is one of the special pseudanthia (false flower) forming the inflorescence of plants in genus Euphorbia.

298. Ray florets have:

(a) Superior ovary
(b) Hypogynous ovary
(c) Half inferior ovary
(d) Inferior ovary

NEET-2020 Phase-I

Ans. (d) : Ray florets are neutral flowers of capitulum inflorescence of the family Asteraceae.



299. Assertion (A) : The inflorescence begin with dichasial cyme but turns as one branch each time, forming around the node is called verticellaster.
Reason (R) : The pollination of these plants takes place by insects called Blastophaga and after fertilization the whole inflorescence become a fruit.
The correct option among the following is.

(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-29.09.2020 Shift-I

Ans. (c) : In verticillaster type inflorescence plant mainly have cross pollination.
• Blastophaga insects pollinate figs or other associated with figs.

300. Match the following

a.	**Polychasial cyme**	**i.**	**Ipomea**
b.	**Solitary cyme**	**ii.**	**Datura**
c.	**Monochasial cyme**	**iii.**	**Nerium**
d.	**Dichasial cyme**	**iv.**	**Solanum**

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(a) (a – i) (b – ii) (c – iii) (d – iv)
(b) (a – iii) (b – ii) (c – iv) (d – i)
(c) (a – ii) (b – iii) (c – iv) (d – i)
(d) (a – iii) (b – ii) (c – i) (d – iv)

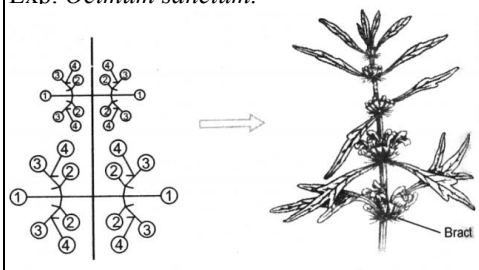
AP EAMCET-25.09.2020 Shift-II

Ans. (b) : Ipomea is the larges genus in the flowering plant conolvulaceae. Inflorescence - Polychasial.
Polychasial - More than two lateral branches arises from the base of first flower, Floral Axis terminates into the flower. This process is reapeated successively.
• **Datura** is a shrub like annual or perinneal herb.
Inflorescence - Solitary and axillary cyme.
Solitary is a large and diverse genus of flowering plants inflorescence - Monochasial
• **Polychasial** - Floral axis terminates in a single flower which is large and old. From the base of the flower arises single lateral branch and form the node, which also terminate into single flower.
Nerium oleander- is a shrub or small tree in the dogbane family Apocyanaceae.
Inflorescence - cymule

301. Verticillaster inflorescence is found in:
(a) mustard (b) Ocimum
(c) China rose (d) sunflower

JIPMER-2019

Ans. (b) : Verticillaster - This type inflorescence characteristic of family ***Lamiaceae.***
• It is condensed cymose inflorescence, each occurs in the axil of opposite leaves having sessile or slightly stalked flowers.
• Each node of the inflorescence bears two opposite clusters of cymes, subsequently become monochasial as the no. of flower in each cluster exceeds three.
• Due to the condensation of axis, flowers of different age appear to form a fasle whorls or vertical.
Exp. *Ocimum sanctum.*



Verticillaster inflorescence of family labiatae (lamiaceae)

302. Edible part of mango is:
(a) Receptacle (b) Epicarp
(c) Mesocarp (d) Endocarp

HP CET-2018

Ans. (c) : Edible part of mango is mesocarp. The mesocarp is the fleshy middle layer of the pericarp of a fruit.

303. The water of coconut is:
(a) Liquid mesocarp (b) Liquid endocarp
(c) Liquid endosperm (d) Liquid nucellus

HP CET-2018

Ans. (c) : The water of coconut is liquid endosperm. Coconut water, the clear liquid inside young green coconuts fruits of the coconut palm is liquid endospermic.

304. Which of the following is not a single flower?
(a) China rose (b) Petunia
(c) Sunflower (d) Holy hope

HP CET-2018

Ans. (c) : The flower is mainly the reproductive. The sunflower is not a single flower at all but a whole booquet.
Sunflower belongs to family compositae. In this family the flowers do not grow individually rather they grow in bunches or clusters.

305. The inflorescence found in Jasmine is a:
(a) Polychasial cyme (b) Cymose
(c) Dichasial cyme (d) Monochasial cyme

TS EAMCET-02.05.2018 Shift-I

Ans. (b) : *Jasmine*, and *Drosera* cymose inflorescence is found. In cymose inflorescence the floral axis steps, the growth after the formation of flower and opening of flower is basipetal (from apex to base).
Cymose- the main axis has limited growth and then new branch arises that also has limited growth.

306. Which of the following is not an example of racemose inflorescence?
(a) Raceme (b) Corymb
(c) Spike (d) Solitary terminal

Tripura JEE-2018

Ans. (d) : In racemose inflorescence the axis, is of unlimited growth apical bud continues to grow. Thus oldest flowers are found at the base and youngest towards the top.
These are different types such as racemes, panicle , spike, spadix etc. Ex. *Delphinium, Brassica campestris, Caesalpinia.*
• In solitary terminal type of inflorescence, single flower are located at the tip of the main stem and the branches. Ex. Poppy.

307. Centripetal, Acropetal and irregular arrangement of sessile flowers are seen in the inflorescences of these plants respectively:
(a) Tridax, Musa and Ficus
(b) Achyranthes, Cocos and Leucas
(c) Carrot, Colocasia and Euphorbia
(d) Hamelia, Crotalaria and Solanum

AP EAMCET-25.04.2018 Shift-II

Ans. (c) : In centripetal inflorescences, older flowers are present in the periphery and younger flowers are located at the centre, ex. – Carrot.
In acropetal inforescences, younger flowers are present at the base and older flowers are located at the center, ex. – Colocasia.
Irregular arrangement of flowers follows no definite pattern of inflorescences. ex. – Euphorbia

308. Inflorescence of which one of the following sets completely develop into composite fruits?
(a) Spike, corymb, hypanthodium
(b) Spike, female catkin, hypanthodium
(c) Umbel, catkin, spadix
(d) Female catkin, corymb, spike

AIIMS-2017
BVP - 2002
AIPMT-1994

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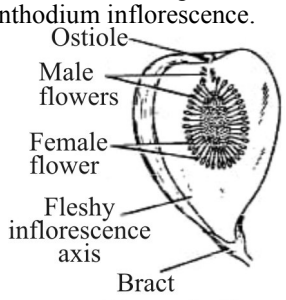
Ans. (b) : The fruit is a ripened ovary. The main function of fruit is to protect the seeds. The composite fruit is a type of fruit which is developed from entire inflorescence rather than a single flower. All composite fruits are false fruit.

• Simple, aggregate, and composite are three kinds of fruits. Composite fruits develop from the spike, female catkin or hypanthodium inflorescence.



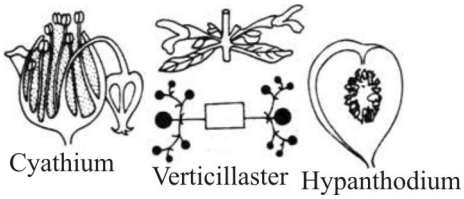
Hypanthodium

309. Which one of the following option is not correctly matched?

(a)	**Cymose**	**Acacia**
(b)	**Hypanthodium**	**Babyan**
(c)	**Cyanthium**	**Euphorbia**
(d)	**Verticillaster**	**Calotropis**

AIIMS-2017

Ans. (d) : The inflorescence of Calotropis is an example of multiparous cymose (Polychasial Cyme).
Verticillaster is a modified, condensed and dichasial cyme inflorescence.



Ex - Salvia, Ocimum and Coelus etc.

310. An inflorescence which contains gall flowers is:

(a) verticillaster (b) cyathium
(c) hypanthodium (d) capitulum

AP EAMCET-2001
AMU -2000
Rajasthan PMT-2000

Ans. (c) : Hypanthodium:- In this type, a hollow spere - like receptacle (Syconium) is formed by the fusion of the rachis of three closely placed cymes.

• The spherical receptacle is like a closed fleshy vessels with a small opening at the apex.

• Three types of unisexual flower (Male fertile female sterile) are arranged on the inner surface of the receptacle in cymose group.

Ex. *Ficus cunia* and banyan, *Ficus benghalensis*.

311. The type of inflorescence in Tulsi:

(a) cyathium (b) hypanthodium
(c) verticillaster (d) None of these

CG PMT-2006

Ans. (c) : A kind of in inflorescence in which the flowers are aligned in a seeming whorl, comprising a pair of opposite auxillary, generally sessile cymes is verticillaster inflorescence.
Example:- Lamiaceae (Tulsi) family.

Hypanthodium Inflorescence The receptacle becomes cup shaped or pear shaped receptacle fleshy with close vessel at top of receptacle. Their opening is called ostiole.
Example:- Ficus

Cyathium inflorescence - Central large female flower surrounded by many flowers, represented by stamens and whole inflorescence represented by a whorl of bract called involucre which is cup shaped and has the nectar glands
Example:- Euphorbia, pulcherrima

312. In Musa, inflorescence is:

(a) spadix (b) corymb
(c) capitulum (d) polychasial cyme

WB JEE-2006
BCECE-2003

Ans. (a) : Spadix is similar to the spike inflorescence but floral axis becomes thick and fleshy surrounded by one or more bract called spathe.
Musa pavadisiaca (banana) etc.

Corymb - inflorescence:-
Rachis shortened flower pedicilate, lower flower have longer pedicle, All the flower almost at the same level.
example:- Cassia, Iberis (candytuft) etc.

Capitulum inflorescence:-
• Flower axis flattened called receptacle opening of flower are centripetal from periphery to center.
• Flower monomorphic or diamorphic when inflorescence is surrounded by whorl of bract called - involucre.
Example:- dahlia, sunflower,

Polychasial cymose inflorescence:-
In this inflorescence - more than two lateral branches arise from the base of first flower, also terminate into the flowers this process repeated successively
Example:- *Calotropis, Hamelia*

313. Assertion: The type of inflorescence in sphaeranthus is cyathium.
Reason: In cyathium type of inflorescence, the flowers are achlamydeous.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Assertion is false but Reason is true

VMMC-2011

Ans. (d) : Assertion is false but Reason is true
Cyathium inflorescence contain pedicillate, achlamydeous flowers of both male and females. The female flower is single and centrally placed while male flower are many numbers and arranged centrifugally e.g- Euphorbia. Sphaeranthus belongs to family Asteraceae in which head capitulum inflorescence is found.

314. Umbel inflorescence is found in :

(a) Musa (b) Colocasia
(c) Coriander (d) Helianthus

Uttarakhand PMT-2004
Manipal-2004

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Ans. (c) : Coriandrum
Umbel inflorescence is found in the members of umbelliferae (apiaceae) family example coriandrum, carrot, allium etc. It is a type of raceme in which flowers are present at the same surface and stalk of all flowers are originated at the same point. Umbel inflorescence contain a very shortened and suppressed axis.

315. The head inflorescence is considered as the most perfect type of inflorescence, because (1) numerous small sized flowers occur on the receptacle (2) flowers are protected by various structures like involucre (3) single visit of insect is sufficient for pollination (4) flowers are dull and colourless
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2009

Ans. (a) : 1,2 and 3 are correct
Capitulum or head inflorescence is a feature of family - Asteraceae or compositae. The main axis or peduncle becomes flattened and is turned receptacle. It bears numbers of sessile, bract containing centripetally arranged flowers or florates. At the base of the receptacle, a whorl of bract is also present which forms in the involucre, so , a single visit of insects is sufficient for pollination, flowers are brightly coloured and usually scented to attract the pollinators.

316. The florets in capitulum of sun flower are arranged in a manner :
(a) centrifugal (b) centripetal
(c) acropetal (d) basipetal

BHU PMT (Mains)-2005

Ans. (b) : The opening of a flower in the racemose inflorescence is in a centripetal manner. This means the centripetal manner of flower opening from the centre to the outside of the inflorescence. For Ex. Sunflower.

317. The type of inflorescence where in the main axis has limited growth and ends in a flower is termed
(a) racemose (b) cymose
(c) hypanthodium (d) cyathium

JIPMER-1999

Ans. (b) : Cymose:- Inflorescence, on the other hand, the main axis has limited growth, being terminated by the formation of a flower. And as each level of branching bear one flower, there are generally a limited number of flower, and oldest flower is either in the centre, or flowers or different ages are mixed up.
Ex. *Solanum nigrum, Calortropis*

318. Cyathium and hypanthodium resemble each other in possessing:
(a) involucres (b) dioecious nature
(c) receptacle (d) None of these

AMU-2011
Punjab MET-2011

Ans. (d) : None of these
Cyathium and hypanthodium resemble in having inflorescence of three types of flowers.
The receptacle is fleshy and form hollow ball like structure with an apical opening. Three types of flowers develop on the inner surface of the receptacle. The female flowers are towards the base, male flowers are in between. Cyathium contains a cup - shaped involucre provided with nectar - secreting glands. There are no nector glands in hypanthodium.

319. Capitulum inflorescence is found in :
(a) Compositae (Asteraceae)
(b) Cruciferae (Brassicaceae)
(c) Solanaceae
(d) Malvaceae

MGIMS Wardha-2004
Haryana PMT- 2003

Ans. (a) : Capitulum:-Flat - topped inflorescence like head but with distinct ray florets and disc florets surrounding by involucre bracts as found in the family. Asteraceae (Compositae).
When floral axis branched and flowers are born on the branches it is called- compound spike.

320. The morphological nature of the organ, which helps in climbing in Cardiospermum is:
(a) inflorescence axis (b) leaf apex
(c) terminal bud (d) axillary bud

AP EAMCET-2003

Ans. (a) : Inflorescence axis
Cardiospermum (balloon vine) belongs to family sapindaceae. Tendrils are found which are formed from the apices of inflorescence axis. The weak plant climbs up with the help of tendrils. The arrangement of flowers on the floral axis is termed as inflorescence.

321. Inflorescence axis is called:
(a) rachis (b) pedicel
(c) petiole (d) peduncle

Haryana PMT-2007

Ans. (d) : Peduncle
The stalk holding the complete inflorescence and bearing the flowers or fruit, in a flowering plant is known as the peduncle.
• Peduncle is the main axis of an inflorescence or the axis bearing a flower or fruit.
• Petiole is the cylindrical stalk that joints the leaf base with leaf blade or lamina.
• Pedicle is a stem that attaches a single flower to the inflorescence.

322. An inflorescence in which flowers arise from different points but reach the same level is known as?
(a) Catkin (b) Corymb
(c) Umbel (d) Spadix

Manipal-2015

Ans. (b) : The corymb is a simple racemose (indeterminate) inflorescence that has a flat topped or convex shape. Ex. *Candytuft and Capsella*
The inflorescence is the arrangement of the flower. If the main axis is shortened and lower flower possess longer stalk so that all flowers are brought to the same level such type of inflorescence is called as corymb.
• But if main axis is short and flower possess stalk of equal length so that flowers are seen to spread out from a common point and such type of inflorescence is called as umbel.
• Catkin is the modified spike inflorescence that possess unisexual flowers.
• Spadix is also a modified inflorescence with the fleshy axis.

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323. In a spadix inflorescence the spathe encloses a:
(a) umbel (b) biparous cyme
(c) catkin (d) spike

JIPMER-2000

Ans. (d) : Spadix inflorescence show a racemose orientation and is enclosed within a broad leaf like bract or sheath called a **spathe.**
Thus, in a spadix inflorencence a spathe encloses the spike of flowers. Ex. Banana
Umbel inflorescence has flowers with pedicels of almost equal length and appears to arise from a common point due to the reduction in the main axis. It is the characterstics of the umbelliferae family.
Biparous or Dichasial cyme inflorescence is that in which growth of the flowering axis is continued by two branches. When the growing point of parent axis is changed into a flower.
Example :- *Dianthus or Bougainvillea*
Catkin inflorescence is a compact unisexual spike that often hangs.
Example:- *Mulberry*

324. Elongated peduncle bearing pedicellate flower continuously in acropetal order is
(a) corymb (b) umbel
(c) raceme (d) head

AMU-2008

Ans. (c) : Raceme is the simple type of racemose inflorescence. In this type of arrangement the pedicellate, bisexual flowers are borne in acropetal succession on the elongated Rachis.
Example:- Crucifereae (mustard, Radish etc.)
When the floral axis is branched and flowers are born on the branches it is called the compound raceme or panicle.
Example:- Yucca, Gulmohur (*Delonix regia*), etc.

325. Which is true?
(a) Umbel is racemose inflorescence-where stalked flower aggregate on a flat receptacle
(b) In raceme the main axis is shortened and flowers are borne acropetally
(c) Spadix is a pendulous spike with main axis much flattened
(d) Spike is a racemose inflorescence having sessile flowers

AMU-2008
VMMC-2008
AIIMS-2009

Ans. (d) : Spike is a racemose inflorescence in which grows **sessile flowers** in the acropetal fashion, e.g. – *Achyranthes* (Chiffon flower), *Callistemon* (Bottle brush), *Adhatoda vasica, Amaranthus*.
• The compound spike is known as the **spike** of spikelets. Sessile flowers (spikeletes) are present on the branched main axis, e.g.– Wheat, Barley, Sorghum, Oats etc.
Spike is a racemose inflorescence having sessile flowers.
In umbel flowers are arranged centripetally, In Raceme flowers are arranged acropetally. Spadix is modification of catkin in which the peduncle is thick and fleshy with upper part style.

326. The flowers in a cyathium resemble the ray florets of sunflower in being :
(a) sessile (b) imperfect
(c) neuter (d) bisexual.

AMU-1997

Ans. (b) : Cyathium: This type of inflorescence is found in genus euphorbia of family-Euphorbiaceae, also found in genus pedilanthus of the family.
• In this inflorescence there is a cup-shaped involucres (formed by fused bracts), often provided with necter secreting glands.
• The single female flower, represent by a pistil, in the centre, situated on a long stalk.

327. The most highly evolved and perfect type of inflorescence is
(a) hypanthodium (b) spadix
(c) capitulum (d) poylchasial cyme

AMU-1997

Ans. (c) : Capitulum : flat-topped inflorescence like head but with distinct ray florets and disc florets, surrounding by involucres bracts as found in the family; Asteraceae (compositae).
The advantage of capitulum are :-
(i) A single insect can pollinate numerous florets.
(ii) Compactness of flowers make the condition more attractive. hence - much more changes of pollination.

328. In general, the feature common to the flowers of spadix, cyathium and hypanthodium is that they are
(a) monandrous (b) synandrous
(c) diclinous (d) achlamydeous

AMU-1997

Ans. (c) : The common feature between the flowers of spadix, Cyathium and hypanthodium are diclinous flowers.
• Diclinous in flowering plants. The occurrence of stamen and carpels in separate flowers on the same plant or different plants.

329. Edible part of the apple is
(a) Mesocarp (b) Calyx
(c) Thalamus (d) Pericarp

AMU-2009

Ans. (c) : The fruit of apple is known as pome. It is a false fruit because it is developed by fleshy thalamus, which is also its edible part.
False fruit or pseudocarp is derived from the accessory floral part other than ovary.

330. In cyathium inflorescene the ratio between male and female flowers is:
(a) one : many (b) many : one
(c) one : one (d) one: two

AP EAMCET-2002, 1997

Ans. (b) : Cyathium: This type of inflorescence is found in genus euphorbia of family-Euphobiaceae, also found in genus pedilanthus of the family.
• In this inflorescence there is a cup-shaped involucres (formed by fused bracts), often provided with necter secreting glands.
• The single female flower, represent by a pistil, in the centre, situated on a long stalk.

331. Inflorescence is edible is Brassica oleracea:
(a) var. botrytis (b) var. capitate
(c) var. gangyloides (d) var. germifera

VMMC-2008
AMU-2008

@apna_pdf

Ans. (a) : Vegetative bud is a structure with a short young stem with embryonic leaves which is edible leaves are also an edible part of *Brassica oleracea* as in cabbage.
• The edible cauliflower is *Brassica oleracea botrytis*. The inflorescence or the head of the flower is edible and is known as curd. Cauliflowers have undifferentiated flowers which remains functionless during their first year of growth.
In its second year, the stored nutrients are used to produce a flower spike.

332. Scorpioid cyme is seen in
(a) Hamelia (b) Heliotropium
(c) Clerodendron (d) Nerium
J&K CET-2007

Ans. (b) : Scorpioid cyme:- Successive branches (each forming one flower) are borne on alternate sides. In rhipidium found in *solanum* nigrum.
• Scorpiod is a type of monochasial cyme. Its axis is curved and has lateral branches alternately on both sides of the axis. ex- *Gossypium, Heliotropium, Drosera* (sundew), fressia etc.

333. A racemose type of inflorescence with its main axis almost flat is called:
(a) Corymb (b) Umbel
(c) Spike (d) Capitulum
Rajasthan PMT-2011
J&K CET-2005

Ans. (d) : Capitulum:-Flat - topped inflorescence like head but with distinct ray florets and disc florets surrounding by involucre bracts as found in the family. Asteraceae (Compositae).
It is a type of racemose inflorescence as in the sunflower.

334. Modification of bract in Typhonium is:
(a) seale (b) spathe
(c) involucre (d) glume
AP EAMCET-1999

Ans. (b) : In typhonium the Bracts are modified into enlarged leaves called as **spathe**. These spathe cover the entire inflorescence of typhonium.
Typhonium is a genus in the family Araceae. The plant is harvested from the wild for local use as a medicine as antidiarrheal, anti-inflammatory and food.

335. Inflorescence in Jatropha is:
(a) monochasial scorpioid cyme
(b) polychasial cyme
(c) dischasial cyme
(d) solitary flower
AP EAMCET-1999

Ans. (c) :Dichasial (biparous) cyme:- Two branches arising below the apical flower at each level so that the flower is between the fork of two branches, as in *Stellaria* and *Dianthus*
• Dichasial cyme inflorescence is present in the Jatropha. Jatropha is a medicinal plant and is member of family **Euphorbiaceae.**

336. Rhipidium inflorescence in Solanum nigrum is modification of :
(a) uniparous cyme (b) multiparouschyme
(c) scorpioid (d) capitulum
Haryana PMT-2011

Ans. (c) : Scorpioid cyme:- Successive branches (each forming one flower) are borne on alternate sides. In rhipidium found in *Solanum* nigrum.
• Scorpiod is a type of monochasial cyme. Its axis is curved and has lateral branches alternately on both sides of the axis. ex- *Gossypium, Heliotropium, Drosera* (sundew), fressia etc.
• Capitulum also called racemose head in which peduncle is flattened that form receptacle that holds centripetally arranged sessile flowers or florets surrounded by an involucre of bracts.
Example :- Sunflower
• In multiparous cyme, the main branch converts into flower, the old flower at the center and younger at the periphery while it produces lateral branch as well.
Example - Calotropis

337. The fleshy receptacle of syconus of fig encloses a number of :
(a) achenes (b) samaras
(c) berries (d) mericarps
JIPMER-2012

Ans. (a) : Syconus develop from hypanthodium type of inflorescence. The flask shaped fleshy receptacle encloses female flower which produces small achene like fruitlets and has a small pore protected by scale leaves. After pollination the florets develop into achenes and drupes, which encloses the seeds.

338. Cymose inflorescence is present in:
(a) Trifolium (b) Brassica
(c) Solanum (d) Sesbania
AIPMT (Screening)-2012

Ans. (c) : Cymose Inflorescence is also called definite or determinate inflorescence.
Growth of the peduncle is indefinite. Here, the terminal bud is modified into a flower.
Flowers develop in basipetal succession, i.e. mature flowers are towards the base.
Flower open in centrifugal sequence, i.e. flowers open from centre to the periphery of the inflorescence eg. *Solanum, Ranunculus*, Datura, *Gossypium* etc.

339. Inflorescence is racemose in:
(a) Soyabean (b) Brinjal
(c) Tulip (d) Aloe
NEET (Karnataka)-2013

Ans. (a) : Soyabean belongs to fabaceae family which having racemose inflorescence.
• Racemose inflorescene is also called indefinite and indeterminate type. Growth of the peduncle is indefinite. Here the terminal bud will not modify into a flower. Flowers develop in acropetal succession i.e. mature flowers are towards the base and the younger ones towards the tip of the peduncle. Flower open in centripetal succession i.e. opening of flowers proceeds from the periphery to the centre of the inflorescence. Peduncle may be unbranched or branched.

340. In a cymose inflorescence the main axis:
(a) Terminates in a flower
(b) Has unlimited growth
(c) Bears a solitary flower
(d) Has unlimited growth but lateral branches end in flowers
NEET (Karnataka)-2013

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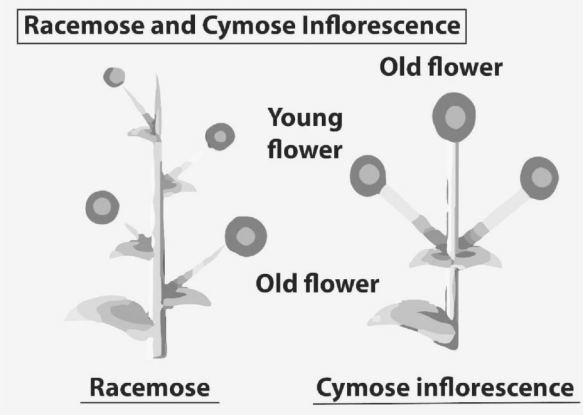
Ans. (a) : Cymose inflorescence is also called definite or determinate inflorescence. Growth of the peduncle is definite. Here the terminal bud is modified into a flower.

- Flower develop in basipetal succession i.e. mature flowers are towards the apex and young flower bud are towards the base.
- Flowers open in centifugal sequence i.e. flowers open from centre to the periphery of the inflorescence e.g. *Solanum, Ranunculus,* Datura, *Gossypium* etc.



341.The ovary is half inferior in flower of :

(a) Guava (b) Peach
(c) Cucumber (d) Cotton

AIPMT (Screening)-2011

Ans. (b) : The flower in which ovary and floral parts are arises from the same point called, perigynous and ovary semi-superior, Ex- Rosaceae family.

- In Guava and cucumber, both are epigynous (ovary fused with thalamus and other floral part found in top of ovary.)
- Cotton belongs to family malvaceae in which ovary is Superior, flower is, Actinomorphic with axile placentation.

342. Flowers are Zygomorphic in :

(a) Datura (b) Mustard
(c) Gulmohar (d) tomato

AIPMT (Screening)-2011

Ans. (c) : Symmertrical flowers are of two types:

- **Zygomorphic (%)** flower can be divided into two equal half (mirror image). These flowers can be cut into two halves only in a single vertical plane. It exhibit Bilateral symmetry. Gulmohur is a zygomorphic flower.
- **Actinomorphic** - ⊕ flowers show Radial symmetry i.e. cut any side of flower it will give rise two equal halves. Examples are rose, tulip, mustard, tomato, datura etc.

343. From the following, identify the plants having inflorescences with male, female and sterile flowers.

I. Casuarina **II. Vernonia**
III.Colocasia **IV. Ficus**

(a) I, II (b) II, III
(c) III, IV (d) I, IV

AP EAMCET-2010

Ans. (c) : Colocasia and Ficus plant have inflorescence with male female and sterile flower.

- In **Ficus**, the receptacle becomes pear shaped and contain a hollow central cavity and hairy opening called ostiole at their anterior side. The hollow cavity bear male flower at the outside between these two type of flower, sterile flower with short style are situated. These sterile flowers are called gall flower.
- **Colocasia**:- inflorescence consist a spadix subtended by persist spathe female flower at the base of spadix male flower at apex with sterile flower between them.

344. A student observed 34 inflorescences in Bougainvillea and 42 inflorescences in Poinsettia. Find out the number of flowers in Bougainvillea and the number of female flowers in Poinsettia respectively.

(a) 34, 126 (b) 68, ∞
(c) 204, 164 (d) 102, 42

AP EAMCET-2011, 2009

Ans. (d) : In Bougainvillea, inflorescence is dichasial cyme, where medianly situated peduncle itself finishes in a flower and bears two lateral floral branches at the base of its origin. Hence, in 34 inflorescences, the number of flowers are 102. In Poinsettia, inflorescence is cyathium, in which a single central female flower remains surrounded by numerous male flowers in a cup formed by the fusion of involucres. So in 42 inflorescences, the number of female flowers are 42.

Bougainvillea : - Inflorescence-cyme
No. of flowers in each inflorescence-3
Total no. of flowers in 34 inflorescence = 34 × 3 = 102
Ponsettia:- Inflorescence - cyathium (but 3 carpels in one flower)
No. of flowers in each inflorescence - 1
Total no. of flowers in 42 inflorescence = 42 × 1 = 42

345. Study the following lists:

	List-I		List-II
A.	Gall flowers	1.	Spikelet
B.	Involucre	2.	Hypanthodium
C.	Spathe	3.	Cyathium
D.	Lemma	4.	Umbel
		5.	Spadix

The correct match is:

	A	B	C	D
(a)	2	4	5	3
(b)	3	4	2	5
(c)	2	3	5	1
(d)	3	4	2	1

AP EAMCET-2005

Ans. (c) : List –I	List-II
A. Gall Flowers	2. Hypanthodium
B. Involucre	3. Cyathium
C. Spathe	5. Spadix
D. Lemma	1. Spikelet

- **Gall flower** is a short style containing female flower occurs in hypanthodium inflorescence.
- **Involucre** is a cup shaped structure formed due to fusion of 4 or 5 bracts.
- It occurs in cyathium inflorescence, **spathe** is a colored leaf-like structure which occurs in spadix inflorescence.
- **Lemma,** one of two bracts that protects the flower of grasses in which spikelet inflorescence occurs.

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346. The type of inflorescence in a plant showing polygamous condition and lateral style is:
(a) Compound corymb
(b) Compound umbel
(c) Compound head
(d) Compound receme

AP EAMCET-2013

Ans. (a) : Compound corymb –It is a modified raceme with relatively a short main axis, in which the lower flowers have much elongated pedicels so that the flowers come to the same level. Typical example - **Cauliflower**

• **Compound umbel** - In a compound umbel, **all the umbel inflorescences arise from a common point** and appear to be at about the same level (example-wild carrot, coriander)

This organization is the same for compound spikes, catkins, corymb, and heads.

• **Compound head-** A dense concave, convex, spherical or flat - topped inflorescence of numerous sessile flower clustered on a common disc or receptacle. A capitulum is usually subtended by an involucre of bracts. Eg. Compositae (Asteraceae) family.

• **Compound raceme-** A compound raceme, also called a panicle, had a branching main axis. Examples of racemes occur on mustard (*genus Brassica*) and radish (*genus Raphanus*) plants.

347. Which of the following pairs is not correct ?
(a) Corymb-candytuft
(b) Capitulum-sunflower
(c) Catkin-mulberry
(d) Raceme-wheat

J&K CET-2004

Ans. (d) : A raceme or racemoid is an unbrached intermediate type of inflorescence bearing flowers having short floral stalks along the shoots that bear the flowers. So raceme is a flower not wheat.

348. A taxon belonging to order sapindales has a single fleshy fruit with edible mesocarp and stony endocarp. The number of carpels in the flower of this taxon is
(a) 3 (b) 5
(c) 1 (d) 2

TS EAMCET-2015

Ans. (c) : A taxon belonging to order spindales has a single fleshy fruit with edible mesocarp and stony endocarp the number of carpels in the flower of this taxon is 1, because the fruit of this taxon is develops from a monocarpellary ovary.

349. The characteristic inflorescence of family - Asteraceae is:
(a) Umbel (b) Spadix
(c) Catkin (d) Capitulum

UP CPMT-2013

Ans. (d) : The distinguishing characteristic of Asteraceae is their inflorescene, a type of specialised, composite flower head or pseudanthium, technically called a capitulum, that may look superficial like a single flower.

350. Inflorescence with universal sessile flower is:
(a) spike (b) spikelet
(c) catkin (d) spadix

J&K CET-2002
AMU-2014

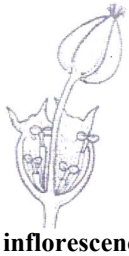
Ans. (a) : Spike- It is similar to the raceme but flowers are sessile born in acropetal succession on eleongated Rachis as Polyaltha, Adhatoda.

351. The type of arrangement of flower and mode of distribution of flower on a shoot of palm tree is:
(a) Spikelet
(b) Spadix
(c) Spike of spikelets
(d) Compound spadix

CMC Vellore-2013

Ans. (d) : The type of arrangement of flower and mode of distribution of flower on a shoot of plam tree is compound spadix. When spadix is branched called spadix and surrounded by boat shaped spathe. E.g. coconut.

352.



The above inflorescence is a:
(a) Cyathium (b) Dichasial cyme
(c) Umbel (d) Panicle
(e) Verticillaster

Kerala PMT-2009

Ans. (a) : A cyathium is one of the specialised Pseudanthia forming the inflorescence of plants in the genus Euphorbia. A cyathium consists of five bracteoles. These are small united bracts, which form a cup-like involucre. Their upper tips and free and in the begining cover the opening of the involucre.

353. In an inflorescene, two types of small, sessile flowers were observed. They are arranged in centripetal manner and have reduced hair like sepals. Which pair of the following character are not associated with such flowers?
i. Nectar glands at the base of the corolla
ii. Axile placentation
iii. Superior ovary
iv. Scaly bracts
The correct pair is
(a) ii, iii (b) iii, iv
(c) i, ii (d) i, iv

AP EAMCET-2008

Ans. (a) : In capitulum inflorescene, two types of centripetally arranged sessile flowers with hair-like sepals occurs. The gynoecium has inferior ovary with basal placentation. Nectar glands at base of corolla and scaly bracts is associated with them.

354. Study the following table.

i.	False whorl like inflorescence	Many sessile bisexual flowers	Leonotis
ii.	Single flower like inflorescence	Many stalked staminate and pistillate flowers	Poinsettia

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iii.	Fruit-like inflorescence	Many sessile staminate flowers on the top and pistillate flowers at the base and sterile flowers in between	Ficus
iv.	Fleshy axis of inflorescence	Many stalked staminate flowers at the base and pistillate flowers on the top and sterile flowers in between	Colocacia

The correct pair is:
(a) i, iii (b) i, iv
(c) ii, iii (d) ii, iv

AP EAMCET-2008

Ans. (a) :

False whorl like Inflorscence → **Many sessile bisexual flower** → Leonotis

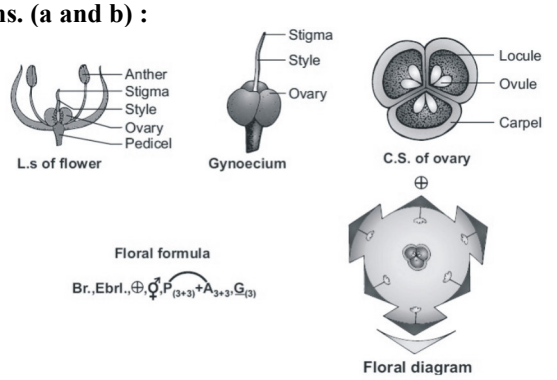
Fruit like Inflorscence → Many sessile staminate flowers on the top and pistillate flowers at → Ficus
The base and sterile flower in between.

• **Poinsettia** → The poinsettia is a commercially important plant species of the diverse Spurge family. Indigenous to Mexico and Central America, the poinsettia was first described by Europeans in 1834. It is particularly well knwon for **its red and green foliage** and is widely used in christmas floral displays.

355. Inflorescence of Liliaceae is:
(a) Actinomorphic (b) Trimerous
(c) Pentamerous (d) Imperfect

AIIMS-2011

Ans. (a and b) :



Liliaceae Floral formula:

$$Br, Ebrl, \oplus, \male\female, P_{(3+3)}, A_{3+3}, G_{(3)}$$

'Br' represents bracteate condition and 'Ebrl' represented by Ebracteolate, '⊕' represents actinomorphic condition, '♂♀' represents bisexual condition.

'$P_{(3+3)}$' represents perianth with tepals arranged in two whorls. 'A_{3+3}' represents six stamens.
The flowers of Liliaceae show epiphyllous condition (Stamens attached to tepals).
$G_{(3)}$ represents tricarpellary syncarpous gynoecium.
•When we use the term inflorescence we actually talk about the flower head or all the parts of a plant that bear the flower. In the case of the lily, the inflorescence may include an umbel, a raceme or just a solitary terminal flower.

356. The most advanced type of inflorescence is:
(a) Corymb (b) Catkin
(c) Spadix (d) Capitulum

WB JEE-2007

Ans. (d) : In capitulum inflorescence flower axis flattened called receptacle. Opening of flower are centripetal i.e- from periphery to center. E.g. Marigold

357. All given statements regarding cymose inflorescence are correct except:
(a) Main axis terminate in a flower
(b) Development of flowers basipetal
(c) Opening of flowers is centrifugal
(d) Unlimited growth of axis

MGIMS Wardha-2015

Ans. (d) : Unlimited growth of axis.
The floral axis stop the growth after the formation of flower and opening of flowers is- Basipetal (from apex to base)
• If rachis flattened called Receptacle and opening of flowers centrifugal (from center to periphery).

358. Cyathium is a type of :
(a) Alga (b) Fungus
(c) Bactrium (d) Inflorescence

Manipal-2001

Ans. (d) : Cyathium- This type of inflorescence is found in genus **Euphorbia** of family - Euphorbiaceae, also found in genus pedilanthus of the family.
• In this inflorescence there is a cup- shaped involucre (formed by used bracts) often provided with nectar secreting glands.
• The single female flower, represented by a pistil, in the centre, situated on a long stalk.

359. Identify the right combination
(a) Carrot - Tuberous root -Head inflorescence
(b) Onion – Bulb - Corymb
(c) Colocasia - Rhizome - Spadix
(d) Bougainvillea -Thorns - Cymule

AP EAMCET-2015

Ans. (d) : Right combination is:- In same plant stem modified the stiff, hard, sharp, pointed structure called the throns, means for defence.
Bougainvillea- Thorns-cymule.
Thorns of bougainvillea are modified stem, present in the axil of leaves of thas cymule inflorescchec which is a small cyme with one terminal and two lateral flowers borne in basipetal order.

360. In a plant the peduncle is elongated and it bears pedicillate flowers. The older flowers lie towards the base and the younger ones near the apex. The growth of the peduncle continues and more flowers are added. the inflorescence is:

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(a) raceme (b) corymb
(c) umbel (d) head

BCECE-2012
J&K CET-2003

Ans. (a) : Raceme is a simple type of racemose inflorescence in this type of arrangement unbranched, elongated peduncle bearing pedicellate or stalked flower acropetally.
Ex.*Brassica.*

361. Cyathium is characterised by (1) single female flower surrounded by many male flowers (2) as involucres of bracts enclosing all the flowers (3). fleshy inflorescence axis with a pearshaped cavity inside (4) single male flower surrounded by many female flowers
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (b) : Cyathium is characterised by -
(1) Single female flower surrounded by many male flowers.
(2) As involucres of bracts enacts enclosing are the flowers.
So, 1 and 2 correct.

362. The inflorescence found in Ficus is known as :
(a) Cyathium (b) Catkin
(c) Syconus (d) Hypanthodium

Punjab MET-2004

Ans. (d) : Hypanthodium- In this type, a hollow sphere- like receptacle (syconium) is formed by the fusion of the rachis of three closely placed cymes.
• The spherical receptacle is like a closed fleshy vessels with a small opening at the apex.
•Three types of unisexual flowers (male fertile and female sterile) are arranged on the inner surface of the receptacle in cymose groups.
E.g. ***Ficus cunia*** and banyan, ***Ficus benghalensis.***

363. Hairs are found in the inflorescences of *Zea mays* are the modification of:
(a) Style (b) Stigma
(c) Spathe (d) Filaments

AIPMT-2000

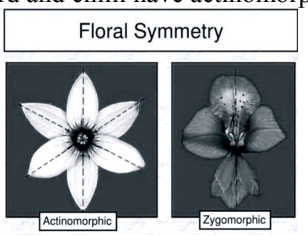
Ans. (a) : The common name of *Zea mays* is corn or maize. It is used as a cereal and is found in the family **Poaceae**. In maize, style is very long. It comes out of the cob to expose stigma for wind pollination. These are collectively known as silk.

G. Flower and Symmetry of Flower

364. The flowers are Zygomorphic in:
(A) Mustard (B) Gulmohar
(C) Cassia (D) Datura
(E) Chilli
Choose the correct answer from the options given below:
(a) (C), (D), (E) Only
(b) (A), (B), (C) Only
(c) (B), (C) Only
(d) (D), (E) Only

NEET-2022
CMC Vellore-2009
Rajasthan PMT-2009
Punjab MET-2009
UP CPMT-2009

Ans. (c) : Zygomorphic flowers (%) are the flowers which can be divided into two equal halves by only one vertical division, these flowers have bilateral symmetry. Datura, mustard and chilli have actinomorphic flowers.



365. Anthesis means
(a) growth of pollen tube inside the carpel
(b) dehiscence of anthers
(c) opening of floral bud
(d) emergence of anthers

JCECE-2009
AFMC-2008
MGIMS Wardha-2007
Manipal-2007

Ans. (c) : Anthesis is the period during which a flower is fully open & functional. Anthesis means the opening of floral buds. It may also refer to the onset of that period. Flowers with diurinal anthesis are generally bright in colour to attract insects during day and flowers with nocturnal anthesis are generally white or less colourful. to attract insects at night.

366. A flower which can be divided into two equal halves by using only plane is:
(a) actinomorphic (b) complete
(c) incomplete (d) zygomorphic

VMMC-2015
WB JEE-2011
J&K CET-2002
Rajasthan PMT-2001

Ans. (d) : When a flower can be divided by a single plane into two equal part of mirror images of each other it is called a zygomorphic flower. They posses bilateral symmetry and are often irregular. Actinomorphic flowers have radial symmetry, Two equal halves are formed by any type of vertical division which passes through the center and flower are regular.

367. Example for asymmetric flower
(a) Gulmohar (b) Cassia
(c) Canna (d) Pea

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : It a flower can not be devided into two similar halves by any vertical plane passing through the centre is called asymmetric flower, as in Canna.
Pea, Gulmohar and Cassia are zygomorphic flowers, it can be devided into two similar halves only in one particular vertical plane.

368. Assertion (A) : Pollen banks can be used in crop breeding programs.
Reason (R) : pollen grains can be stored for Many years in liquid nitrogen.
(a) A and R are true and 'R' is the correct explanation to 'A'
(b) A and R are true but 'R' is not the correct explanation to 'A'

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(c) A is true but R is false
(d) A is false but R is ture

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Pollen banks can be used in crop breeding programmes, similar to seed banks. It is possible to store pollen grains of a large number of species for many years in liquid nitrogen (–196°C) for maintain viability of pollen. The period for which pollen grain remains highly viable depends on prevailing temperature and humidity.

369. State this condition and plant that prevents both autogamy and geitonogamy in this plant
(a) Male and female plants mature at different times - Hibiscus
(b) Male and female flowers on the same plant - Gloriosa
(c) Separate male plant and female plants - Papaya
(d) Male and female flowers on the same plant with different heights - Datura

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : Transfer of pollen grain from anther to stigma of another flower of same plant is called geitonogamy while autogamy is achieved within the same flower. In several species such as Papaya, male and female flowers are present on different plants, this condition prevents both autogamy and geitonogamy.

370. The following plant is characterized by trimerous flowers, superior and trilocular ovary with axile placentation.
(a) Solanum nigrum
(b) Yucca gloriosa
(c) Capsicum frutiscens
(d) Petunia alba

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : Trimerous flowers, superior and trilocular ovary with axile plancentation is characteristic of Liliaceae family. Many plants belonging to this family are good ornamentals eg. tulip and gloriosa. In this family calyx and corolla are not distinct and are termed as perianth.

371. Identify the group of plants belong to the same family based on the floral formula given below

$$\text{Br Ebrl}\oplus\ \male\ \overset{\frown}{P_{(3+3)}+A_{3+3}}G_{(3)}$$

(a) Atropa belladona, Asparagus racemosus, Allium cepa
(b) Cestrum nocturmum, Datura metel, Nicotiana tabaccum
(c) Allium cepa, Gloriosa superba, Dracaena angustifolia
(d) Colchicum autumnale, Petunia alba, Nicotiana tabaccum

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : • Allium cepa, Gloriosa superba, Dracaena angustifolia are belong to family liliaceae commonly called 'Lily family'. The floral formula given as–

$$\text{Br}\oplus\ \male\ \overset{\frown}{P_{(3+3)}}A_{3+3}\ \underline{G_3}$$

• Common characteristics include large flowers with six coloured petaloid tepals that means petals and sepals are not differentiate.

372. Given below are two statements : One is labelled as Assertion A And the other is labelled as Reason R :
Assertion A : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.
Reason R: Internode of the shoot gets condensed to produce different floral appendages laterally at successive nodes instead of leaves.
In the light of the above statements, choose the correct answer from the options given below :
(a) A is false but R is true.
(b) Both A and R are true and R is the correct explanation of A.
(c) Both A and R are but R is NOT the correct explanation of A.
(d) A is true but R is false.

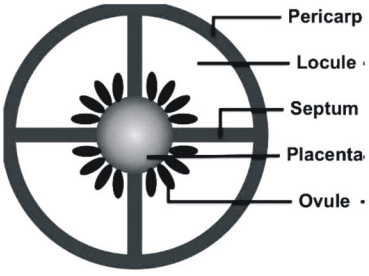
NEET (UG) 07.05.2023

Ans. (b) : Goethe defined the flower is a modified part of shoot.
• Flowers are modified version of the shoot of the plant in which leaves are modified into floral structure.
• Node are located on the stems from where new flowers grow. Internodes are also important because they provide the appropriate distance between two nodes. Internodes are important in plants because they help grow new branches leaves, and flowers. The length of the internodes varies differently.
• The place from where the leaves arises is known as node. The space between the two consecutive nodes is known as internode.

373. Axile placentation is observed in
(a) China rose, Petunia and Lernon
(b) Mustard, Cucumber and Primrose
(c) China rose, Beans and Lupin
(d) Tomato, Dianthus and Pea

NEET (UG) 07.05.2023

Ans. (a) : Placentation is a type of ovule arrangement in which the ovules arise from placental tissue derived from the appices of the septa of a locute.
• Axile placentation occurs in syncarpous pistils.
• China rose shows axile placentation belongs to family malvaceae.
• Petunia belongs to solanaceae family and show axile placentation.
• Lemon belongs to Rutaceae family and it also shows axile placentation.



Axile placentation

374. The ovary is half inferior in :
(a) Mustard (b) Sunflower
(c) Plum (d) Brinjal

NEET-2020 Phase-I

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Ans. (c) : Plum, Peach and Rose flowers are perigynous and ovary is half inferior.

- Plum belongs to Rosaceae family.
- Brinjal belongs to Solanaceae family, Superior ovary with swollen oblique placenta.
- Sunflower belongs to family Asteraceae family, inferior ovary with basal placenta.
- Mustard belongs to family Brassicaceae family, superior ovary with parietal placentation.

375. The term 'polyadelphous' is related to which among the following?

(a) Gynoecium (b) Androecium
(c) Corolla (d) Calyx

AP EAMCET-25.09.2020 Shift-II

Ans. (b) : Androecium is the male reproductive part. They have filaments when these filaments are joined to make groups but the anther remain separated, that condition is called polyadelphous. It happens in citrus.

376. Which of the following is correct:

(a) Perigynous – plum, peach, rose
(b) Epigynous – guava and cucumber
(c) Hypogynous – mustard, rose
(d) Both (a) and (b)

AIIMS-25.05.2019 Shift-II

Ans. (d) : The floral parts are arises at the same point of ovary is called perigynous flower and ovary is semi-superior or semi-inferior.
Ex - Peech, Rose, plum etc.

• Epigynous flowers are having floral parts (such as the petals and stamens) attached to or near the upper part of the ovary, as in the flower of the apple, cucumber, and guava, the ovary is inferior.

• In hypogynous flowers, the perianth and stamen are attached to the receptacle below the gynoecium. The ovary is superior hypogynous flowers are found in tomato, tulip.

Classification of Flower Based on Position of Ovary

Hypogynous *(Ovary Superior)* | **Perigynous** *(Ovary Half-inferior)* | **Epigynous** *(Ovary Inferior)*

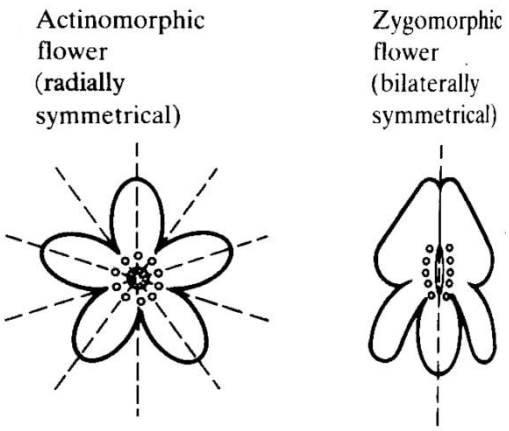
377. Which of the following represent zygomorphic symmetry:

(a) Canna, Mustard, Chilli, Datura
(b) Mustard, Canna, Pea, Datura
(c) Pea, Bean, Cassia, Gulmohar
(d) Pea, Bean, Canna, Chilli

AIIMS-25.05.2019 Shift-II
Rajasthan PMT-2011

Ans. (c) : Generally the **Zygomorphic symmetry** is also called as **bilateral symmetry** occurs in a flower through which it can pass only one plane of symmetry that will divide it into two parts.
Ex- Fabaceae family.

• Pea, Bean, Cassia and Gulmohar belong to Fabaceae. So, the correct answer is Pea, Bean, Cassia, Gulmohar.



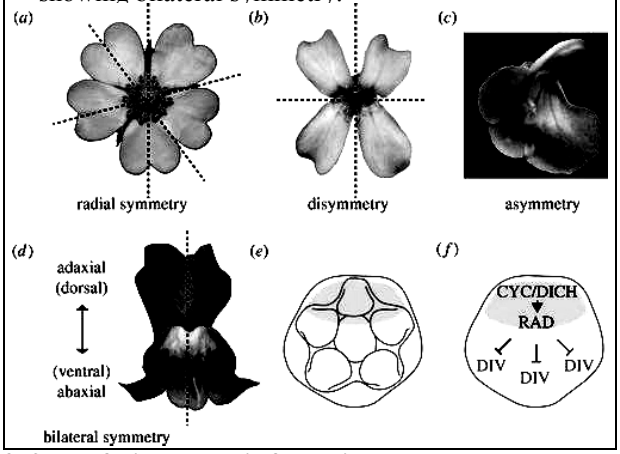
378. Radial Symmetry is found in the flowers of.

(a) Brassica (b) Trifolium
(c) Pisum (d) Cassia

Tripura JEE-2017
NEET-2016 Phase-II

Ans. (a) : The Brassica flowers can be cut into two equal halves from any plane. So, it shows the radial symmetry. These flowers are referred to as actinomorphic flowers. Radial symmetry is found in flowers like Mustard, Datura and Chilli.

- Pisum, Trifolium and Cassia are the members of Fabaceae family having zygomorphic flower showing bilateral symmetry.



379. Inferior ovary is found in

(a) Carrot (b) Rose
(c) Citrue (d) Cucumber

Tripura JEE-2017
UP CPMT-2013

Ans. (d) : Imbicate aestivation: It is an arrangement in which sepal and petals are internal and they are lying overlapped on both the margins. In this one sepal or petals are external and overlapping with each other.

The family compositae or asteraceae is characterised by presence of inferior ovary. In this ovary thalamus is flattened and the other floral organs. The flower that have inferior ovary called epigynous flower.

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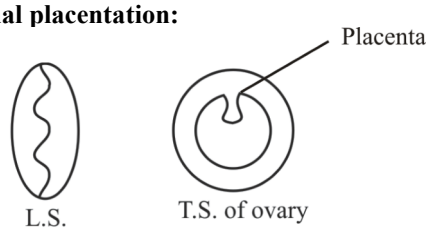
380. In a flower of a plant the number of carpels is equal to the number of inner whorl of perianth lobes and cotyledons 1/3 of carpel number. What is the arrangement of ovules on placenta of the flower of that plant?
(a) Axile (b) Marginal
(c) Basal (d) Parietal
TS EAMCET-2015

Ans. (a) : Axile placentation: When the placenta is axile and the ovules are attached to it in a multilocular ovary, the placentation is said to be axile in multicarpellary syncarpous ovaries, the carpels fuse to form septa which form a central axis. The ovules are arranged on the axis. **ex:** Malvaceae, Solanaceae , Lilliaceae.
Marginal placentation:



It develops form monocarpellary & unilocular ovary, placenta born at the margin as Leguminaceae.
Basal placentation: It develops form monocarpellary to tricarpellary but unilocular ovary placenta develops from the based usually shaded as- Gramineae/Poaceae, compositae.
Parietal Placentation: It develops from bicarpellary to multicarpellary but unilocular ovary.
Except Crucifer:- Where false septum develops called as Replum.
Placenta develops on the periphery.

381. Anemophilous flowers have :
(a) sessile stigma
(b) small and smooth stigma
(c) colored flower
(d) large and feathery stigma
WB JEE-2006
BHU PMT-2001

Ans. (d) : In Anemophilus flowers, pollination is carried out by wind. The plants which is pollinated in this manner are grasses, which have insignificant flowers with large, often feathery stigma.
Anemophilous flowers have large feathery stigma to easily trap the air born pollen grains. Anemophily is quite common in grasses, maize, wheat, sugarcane, bamboo etc.

382. Which is present in monocot flowers?
(a) Sepals (b) Petals
(c) Tepals (d) None of these
BVP-2012
MGIMS Wardha-2007

Ans. (c) : If the perianth is relatively undifferentiated, or if its components intergrade in form, the individulas leaf- like parts are called as tepals.
• Green tepals are called as sepaloid and coloured tepals are called as petaloid.
• Tepals are individual parianth segment. The parianth is collective name as undifferentiated sepals and petals these are found in monocot flowers. The parianth segment of Gramineae are called lodicules.

383. Irregular flowers are
(a) asymmetrical (b) symmetrical
(c) achlamydous (d) All of these
Manipal-2011

Ans. (*) : Irregular flower are those in which some of the floral leaves in any one series have a different shape from the other for example, the petals of pea or violet. They have only one plane of symmetry.
These flowers are bilaterally symmetrical i.e - they are divisible into equal halves about one plane only. The irregular flower is also called the zygomorphic flower.

384. When gynoecium is present in the topmost position of thalamus, the flower is known as :
(a) Inferior (b) Epigynous
(c) Perigynous (d) Hypogynous
Uttarakhand PMT-2004
Manipal-2004
AMU-2005

Ans. (d) : The gynoecium is situated at the top of the thalamus. If upper part of thalamus is slightly swollen and forms a cushion like a disc. Thalamlus is basically the receptacle found in angiosperms.
Ex- Hibiscus *rosa sinensis*, *ranunculus*, Brassica, Brinjal etc.

385. Assertion : Insects visit flower to gather honey.
Reason : Attraction of flowers prevents the insects from damaging other parts of the plant
(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not correct explanation of assertion
(c) Assertion is true but reason is false
(d) Both assertion and reason are false
HP CET-2011

Ans. (d) : Attraction to flower can't prevent the insects from damaging other parts as only those insects are attracted to the flowers, which help in pollination not gather honey, such as bees, moth etc.
Nectar and pollen grains are the usual floral rewards provided by the flower to the insect and the body of the animal get a coating of pollen grain which are generally sticky in animal pollinated flowers. These pollen grains are burst of when the insect body comes in contact with a receptive stigma.
Thus, both assertion & reason are false.

386. The smallest flower is that of the :
(a) Onion
(b) Mustard
(c) Fig
(d) Wolffia microscopia
JIPMER-1999

Ans. (d) : Wolffia species are the smallest flowering plants on earth with 2mm measurements. They are commonly called as watermeal or duckweed. Wolffia species are free floating plants without roots. The flower has one stamen and one pistil.
Rafflesia is largest flower with the measurement of 60 cm to 80 cm.

387. The order of opening of flower parts from the periphery towards the centre is called
(a) acropetal (b) centripetal
(c) centrifugal (d) basipetal
J&K CET-2009

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Ans. (b) : In general the order of opening of floral parts from the periphery towards the center is called centripetal, while from centre towards the periphery is called centrifugal.

• **Acropetal** order is a flower arrangement in which the new flowers are at the top, and the older flowers are at the bottom.

• **Basipetal** The arrangement of older flowers at the apex and fresh flowers and buds at the base is known as basipetal flower.

388. Opening of floral buds into flowers is a type of
(a) autonomic movement of locomotion
(b) autonomic movement of variation
(c) paratonic movement of growth
(d) autonomic movement of growth

Rajasthan PMT-2010

Ans. (d) : Opening of floral buds into flower is a type of autonomic movement of growth (Nastic movement). This is a non directional movement in which the response is determined by the structure of the responsive organ and not to the direction of stimulus. Greater growth on one side causes the organ to bend to the opposite side.

389. Cleistogamous flowers
(a) open at dusk (b) open at dawn
(c) open during noon (d) never open

AMU-2011

Ans. (d) : Cleistogamous flowers never open, only self pollination occurs within the bud. Bisexual flowers which do not open at all are called cleistogamous. In such flowers anthers and stigma lie close to each other. When the anthers dehiscence in flower buds, pollen grains come in contact with the stigma and pollination occurs.
Cleistogamous flowers are found in *Arachis hypogea*.

390. There are certain plant species, which flowering occurs only once in their life span. This condition is named as
(a) Polygamous (b) Polycarpic
(c) Monocarpic (d) Pericarpic

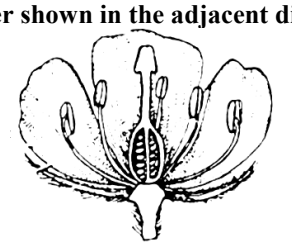
Uttarakhand PMT-2009
AMU -2000

Ans. (c) : Monocarpic plant is that which flowering and fruiting occurs only once in life. All annuals and biennials are monocarpic, Ex - Agave, Bambusa tulda, Melocanna bambusoides. They die after bearing fruit.

• In polygamous condition unisexual (male + female), bisexual and neuter flowers are present on the same plant, Ex - Mango, Ray florets of sunflower.

• Polycarpic are those perennial plants, which bear fruits every year after attaining maturity Ex - Mango, Litchi, Guava, Lemon, Orange etc

391. The flower shown in the adjacent diagram is :



(a) Homochlamydeous unisexual and hypogynous
(b) Homochlamydeous bisexual and epigynous
(c) Dichlamydeous bisexual and hypogynous
(d) Heterochlamydeous bisexual and epigynous

Karnataka CET-2003

Ans. (c) : The flower shown in the diagram has two whorls of perianth, when the calyx and corolla are distinct the condition is called dichlamydeous. It is bisexual because both sex organs (stamens and ovary) are present together and hypogynous because ovary is superior.

392. Which one of the following is a monocarpic tree?
(a) *Bambusa vulgaris*
(b) *Corypha umbraculifera*
(c) *Phoenix dactylifera*
(d) *Elaeis guineensis*

Karnataka CET-2003

Ans. (a) : Monocarpic plants are exactly opposite to the polycarpic plants. It produce flower and seeds once in their life span.
Example:- *Bambusa vulgaris* (bamboo), Rice, Radish etc.

393. Empty glumes are
(a) petals (b) bracts
(c) anthers (d) carpels

AMU-2007

Ans. (b) : Bracts are often different from foliage leaves. They may be smaller, larger or of a different colour, shape or texture, typically they also look different from the parts of the flower, such as the petals or sepals.

• Glumes are basal, membranous, outer sterile husk or bract in the flower of grasses (Poaceae) and sedges (Cyperaceae). A bract is a modified or specialized leaf, specially one associated with a reproductive structure such as a flower, inflorescence axis or cone scale.

394. Which one of the following is correct match?
(a) Monarch – Nicotiana tabacum
(b) Diarch – Trapa natans
(c) Triarch – Pisum sativum
(d) Tetrarch – Ricinus communis

AP EAMCET-2003

Ans. (c) : In roots, the xylem is solid core with ridge like projections extending towards the pericycle. In relation to number of xylem ridges present in the roots, xylem may be called as monarch.
Ex- Trapa natans
Diarch - Nicotiana tabacum
Triarch - Pisum sativum
Tetrarch - Ricinus communis

395. Arrange the following genera in the increasing order of number of carpels in each flower:
1. Abutilon 2. Bauhinia
3. Allium 4. Nicotiana
The correct answer is:
(a) 2 4 3 1 (b) 2 3 4 1
(c) 4 2 3 1 (d) 1 3 4 2

AP EAMCET-2004

Ans. (a) : (i) Abutilon belongs to family Malvaceae. Gynoecium is pentacarpellary or polycarpellary, syncarpus but stigma free, so gynoecium is incompletely syncarpous.

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(ii) Bauhinia belongs to family Fabaceae.
Gynoecium is monocarpellary with marginal placentation
(iii) Allium belongs to family Liliaceae,
(iv) Nicotiana belongs to family Solanaceae.
Gynoecium is bicarpellary, syncarpous, ovary superior, biloculor. The decreasing order of number of carpels in each flower is-
Bauhinia >Nicotiana > Allium > Abutilon.

396. Clove the commonly used spice is obtained from the parts of plant
(a) stem (b) flower bud
(c) root (d) fruit
VMMC-2014

Ans. (b) : Clove, commonly used as spices is obtained from the *Syzygium aromaticum* flower bud of plant, belong to family Myrtaceae. These flower buds are pale in color at first and gradually become green and brown and bright red at the collecting time.

397. Which one of the following is an advanced floral feature?
(a) Hypogyny (b) Bisexuality
(c) Apocarpy (d) Zygomorphy
AP EAMCET-2001

Ans. (d) : The advanced floral characteristics are - Zygomorphy has evolved more than once in mono cotyledons.
- Zygomorphic or bilateral symmetry.
- Epigynous ovary (inferior). Flower part are united with each other.
- Flower parts like sepals, petals, stamens, pistils are few (less than 10), Dichlamydeous (fused stamens)
- Albuminous seed and Simple leaves.

398. Umbel inflorescence is found in
(a) Musa (b) Colocosia
(c) Coriandrum (d) Helianthus
AMU-2005

Ans. (c) : Umbel inflorescence is found in *Coriandrum sativum*. In this type of inflorescence flowers appears to develop from a common point and pedicillate. A group of bracts are involucre, which is always associated with the umbel and each flower arises from the axis of bract. In coriandrum compound umbel is present, when flower axis is branched called the compound umbel.

399. Floral diagram fails to indicate
(a) epiphylly and epipetaly
(b) aestivation and placentation
(c) position of ovary on the thalamus
(d) cohesion of carpels and stamens
AMU-1997

Ans. (c) : Floral formula is a convenient way to store the retrieved information about plants. Floral diagram represent the number of a flower, their general structure arrangement, aestivation, adhesion, cohesion, position with respect to mother axis.
Therefore floral diagram fails to indicates the position of the ovary on the thalamus whether superior or inferior.

400. Largest flower is
(a) Rafflesia arnoldii
(b) Helianthus annuus
(c) Welwitschia mirabilis
(d) Nelumbo nucifera
AMU-2009
BHU PMT(Screening)-2005

Ans. (a) : Rafflesia arnoldii is noted for producing the largest individual flower on earth. *Rafflesia arnoldii* is a species of flowering plant in the parasitic genus Rafflesia. It has a very strong and horrible odour of decaying flesh, and nicknamed "corpse flower".

401. One of the following is not a flower
(a) Shoe flower (b) Passion flower
(c) Sunflower (d) May flower
MGIMS Wardha-2011
BVP-2002

Ans. (c) : This inflorescence is known as capitulum or head inflorescence. Two kinds of florets are recognised in sunflower.
Sunflower (Helianthus annuus) is a member of the Asteraceae family. Its flower is not real flower but it is a whole inflorescence having a group of many small flowers.
(i) **Ray florets** arranged on the receptacle having distinct yellow and strap shaped petals. These florets are female, sterile and are always zygomorphic and may be arranged in one or many whorls.
(ii) **Disc florets** grouped in the center are bisexual and actinomorphic.

402. A hyaline bisexual and self-fertilized flower that does not open at all is
(a) Chasmogamous (b) Apogamous
(c) Cleistogamous (d) polygamous
MGIMS Wardha-2009

Ans. (c) : A hyaline, bisexual and self fertilized flower that never open is called Cleistogamous flower, while chasmogamous flower expose their mature stigma and anthers to the pollinating agents.

403. Syngenesious condition means
(a) anthers fused and filaments free
(b) both anthers and filaments fused
(c) filaments fused and anthers free
(d) filaments fused with carpels
AMU -2011, 2000
BHU PMT (Screening)-2011

Ans. (a) : Syngenesious is an exceptional feature of family asteraceae (compositae)
- The syngenecious or synandrous condition of androecium is a feature of the family Asteraecae where the anther of the filaments are fused to form the tubular mass or group and their filaments remains free.

404. Identify the wrong expression from the following statements.
(a) A plant that bears male, female and bisexual flowers is polygamous
(b) An actinomorphic flower can be dissected into two equal halves from any plane
(c) Superior ovary is found in hypogynous flowers
(d) The side of the flower towards the bract is called the posterior side
VMMC-2010

Ans. (d) : Bract occurs towards the anterior side of a flower while mother axis is or floral axis of a flower occurs towards the posterior side.
Bract is considered as a modified leaf, it bears a peduncle or petiole in its axis.

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405. Elongated peduncle bearing pedicellate flower continuously in acropetal order is:
(a) Corymb (b) Umbel
(c) Raceme (d) Head
VMMC-2008

Ans. (c) : In this type of arrangement unbranched, elongated, peduncle bearing pedicillate or stalked flower acropetally e.g, Delphinium, Raphanus, Lunaria and Lupinus.
Raceme is a simple type of racemose inflorescence.

406. Spathe is present in the flowers of:
(a) Banana (b) Rice
(c) Marigold (d) Sunflower
Rajasthan PMT-2011

Ans. (a) : The bract or spathe exposes a cluster of female flowers that are normally arranged in two rows.
Spathe is present in banana flowers. Spathes are boat - shaped bracts that are brightly coloured, larger and spirally arranged structures that protect the flowers. They roll back and fall when flowers open up.

407. Epigynous flowers are present in:
(a) Mustard (b) Brinjal
(c) China rose (d) Cucumber
Rajasthan PMT-2011
JIPMER-2011

Ans. (d) : In epigynous types of flowers that thalamus encloses the ovary entirely and fuses with it.
The sepals petals and stamens arise from the top of ovary. Such flowers known as epigynous and ovary is inferior. Ex- Oenothera, Cucurbita.

408. Keel is the characteristic feature of flower of:-
(a) Indigofera (b) Aloe
(c) Tomato (d) Tulip
AIPMT-2015

Ans. (a) : The flowers of family Papilionaceae have butterfly shaped corolla, the outermost petal is called **standard** or **vexillum**, two lateral petals are similar and clawed, they are called **wings** or **alae** and two anterior petals are called a **keel** this type of petal arrangement is found in the bean, gram, pea, indigofera.
Keel are formed when two anterior small petals are fused at the base. When the keel is formed it forms a concave shape.

409. Night flowers are mostly:
(a) White (b) Green
(c) Red (d) Blue
BCECE-2015

Ans. (a) : In general the dark, due to limited vision, white colour will stand out and the strong fragrance also help to attract the pollinators. That is why night blooming flowers have relatively more fragrance and is generally white in colour.

410. A flower which can be divided into equal vertical halves by more than one plane of division is:
(a) Actinomorphic (b) Zygomorphic
(c) Heteromophic (d) Cyclic
J&K CET-2004

Ans. (a) : Actinomorphic flower: A flower that can be divided in to two equal/identical halve from any plane passing through the central axis of flower. The type of symmetry found in such flower called radial symmetry.
e.g. - Roses, Lilies and Butter cups.

411. The maize plant is monoecious and the flowers are
(a) Cleistogamous (b) Unisexual
(c) Bisexual (d) Neutar
Uttarakhand PMT-2011

Ans. (b) : The maize plant is monoecious and the flowers are unisexual but on the same plant.
Unisexual flowers:- They have only male or female reproductive parts i.e. either stamen or carpels are present
Ex-Bitter gourd, Papaya, Pumpkin & Cucumber.

412. When the flower is regular and radially symmetrical, it is called
(a) Zygomorphic (b) Asymmetric
(c) Unisexual (d) Actinomorphic
UP CPMT-2013

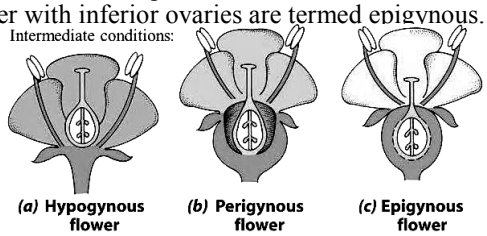
Ans. (d) : When the flower is regular and radially symmetrical, it is called actinomorphic. eg. petunia wild rose and butter cup.
Differences in size or shape of the whorl's part make the flower irregular.
Example - Asiatic day flower & Canna.
A flower that can be divided into two equal / identical halves from any plane passing through the central axis of flower and symmetry is called radial symmetry.
Examples - Mustard, lily, datura etc

413. National flower of India is :
(a) Lotus (b) Lily
(c) Rose (d) Sunflower
BVP-2000

Ans. (a) : National flower of India is Lotus (Nelumbo nucifera). It is one of the important National Symbols of India.

414. Among China rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary?
(a) Four (b) Five
(c) Six (d) Three
AIPMT (Re-Exam)-2015

Ans. (c) : China rose, Musturd, Brinjal, Potato, Onion and Tulip have superior ovary while guava and cucumber have inferior ovary.
Superior ovary is an ovary attached to the receptacle above the attachment of other floral parts.
A superior ovary is found in types of fleshy fruits such as true Berries, Drupes etc.
Flower with inferior ovaries are termed epigynous.



415. Among bitter gourd, mustard, brinjal, chinarose, pumpkin, lupin, cucumber, sunn hemp, gram, guava, bean, chilli, plum, petunia, tomato, rose, withania, potato, onion, aloe and tulip how many plants have hypogynous flower?
(a) Eighteen (b) Six
(c) Ten (d) Fifteen
NEET-2013

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Ans. (d) : In hypogynous flowers, the perianth and stamens are attached to the receptacle below the gynoecium, the ovary is superior to these organs, and remaining floral organs arise from below the point of origin of the carpel. The ovary in such flowers is said to be superior, e.g- mustard, brinjal and china rose etc.

416. In china rose the flowers are :
(a) Zygomorphic, epigynous with twisted aestivation
(b) Actinomorphic, hypogynous with twisted aestivation
(c) Actinomorphic, epigynous with valvate aestivation
(d) Zygomorphic, hypogynous with imbricate

NEET-2013

Ans. (b) : China rose flower is hypogynous with twisted aestivation and actinomorphic.
In hypogynous flowers, the perianth and stamens are attached to the receptacle below the gynoecium, the ovary is superior to these organs, and the remaining floral organs arise from below the point of origin of the carpel.
In twisted aestivation margin of a petal covers adjacent petal and the other margin is covered by another petal.
Actinomorphic is a type of flower symmetry where it is distinguished by being radically symmetrical and capable of division by any longitudinal plane into essentially symmetrical halves.

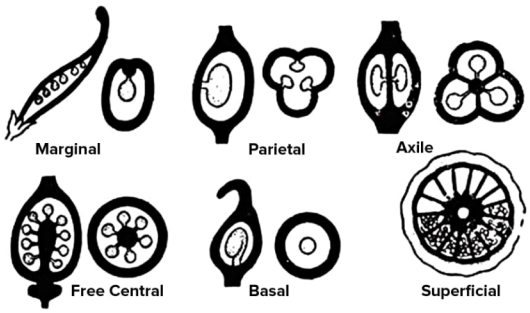
417. How many plants in the list given below have marginal placentation
Mustard, Gram, Tulip, Asparagus, Arhar, Sunn hemp, Chilli, Colchicine, Onion, Moong, Pea, Tobacco, Lupin
(a) Six (b) Three
(c) Four (d) Five

AIPMT (Mains)-2012

Ans. (a) : In the given list six plants have marginal palcentation.

Placentation	Example
Axile	Tomato, Onion, Asparapus, Tabacco, Chilli, Tulip, Calchium.
Parietal	Mustard.
Marginal	Gram, Arhar, Moong, Pea, Lupin, Sunn hemp.

Placentation :-
- It is defined as the arrangement of ovules within the ovary (Placenta).
- Several different forms of placentation can be seen in flowering plants.



418. Which of the following plants has the floral characters like zygomorphic flower vexillary aestivation, diadelphous androecium and marginal placentation ?
(a) Pisum (b) Belladonna
(c) Brinjal (d) Asparagus
(e) Aloe

Kerala PMT-2011

Ans. (a) : Pisum sativum plants have the floral characters like zygomorphic flower, vexillary aestivation, diadelphous androecium and marginal placentation. Pisum belongs to the family Fabaceae.

419. The flower in which the gynoecium occupies the highest position on the thalamus leaving other parts below is called:
(a) hypogynous (b) perigynous
(c) epigynous (d) none of these

J&K CET-2005

Ans. (a) : The flower in which the gynoecium occupies the highest position on the thalamus leaving other parts below is called hypogynous flower.

420. A scorpioid cyme having all the flowers in the same plane is:
(a) Rhipidium (b) Bostryx
(c) Cincinnus (d) Dreponium

AMU-2014

Ans. (a) : Rhipidium: A scorpioid cyme having all the flowers in the same plane.
Ex- *Solanum nigrum.*
Bostryx helicoids cyme: A determinate cyme in which the branches develop only one side due to the abortion of opposing paired.
Cincinnus: A tight, modified helicoids cyme in which the pedicel are very short or a scorpioid cyme or cincinnus is a monochasium in which the branches develop on alternating side of each sequential axis, typically resulting in a geniculate (Zig -Zag) appearance **e.g.** Gossypium (cotton), Drosera (sundew).

421. Plants who flowers single time in their life cycle is known as :
(a) monocarpic (b) holocarpic
(c) polocarpic (d) eucarpic

Rajasthan PMT-1999

Ans. (a) : Plants who flowers single time in their life cycle is known as monocarpic.
Ex – Bamboo plant, Agave.
• **Polycarpic plants:** Plant that produce flower and fruit many times or every year. They are generally biennial or perennial.
Ex- Mango, Litchi, Guava, Lemon and Orange.
• **Holocarpic:** The entire thalamus is converted into reproductive cell – chyteridiomycota.
• **Eucarpic:-** Applied to a fungus in which only part of the thallus differentiates to form a reproductive structure or structures e.g.:- Most of the fungus are eucarpic.

422. Bracts enclosing a cluster of flowers are known as :
(a) bracteate (b) Involucre
(c) petaloid (d) polysepalous

Rajasthan PMT-2003

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Ans. (b) : Involucre: Involucres is used for only cluster of flower protecting the reproductive structures.
Petaloid flower: Petaloid means when sepals resemble petals. **Ex-** Lily, Anemone, Hellebore flowers etc.
Poly sepalous: A condition in flowers that possesses a calyx, consisting of separate sepals.
Spathe: A large bract or pair of bracts forming a sheath to enclose the flower cluster of such plants as palms, arums, crocuses and day flowers (commelina).

423. Study of flower is called :
(a) Anthology (b) Spermology
(c) Malacology (d) Agrostology

Rajasthan PMT-2001

Ans. (a) : Anthology: The study of flower in the form of morphology and anatomy.
Spermology: The study of seed is known as spermology.
Agrostology: The branch of Botany concerned with the study of grasses, especially their classification.
Malacology: It's the field of science which studies the (phylum) mollusca which includes familiar groups of invertebrate including snail and slug, clam and mussels, squids, octopuses, oesters and chitons.

424. Cleistogamous flowers are:
(a) Bisexual flowers which remain opened
(b) Bisexual flowers which remain closed
(c) Open female flower
(d) Open male flower

WB JEE-2014

Ans. (b) : Cleistogamous flower are the ones that do not open and show self pollination. The advantage of a cleistogamous flower is that they are dependent on pollinators, hence producing seed in all conditions.

425. Gall flowers of figs are:
(a) Staminate (b) Pistillate
(c) Neutar (d) Naked

CMC Vellore-2011

Ans. (c) : Gall flower of figs are neutar.
Neutar: Gall flowers are usually neutar and it is used as food for gall wasps which are specific pollinators of hypanthodium inflorescence.
Staminate:- Unisexual flower that bear only male reproductive parts that stamen called staminate flower **ex-** cucumber, chrysanthemum.
Pistillate:- A flower that lack stamens is pistillate and female part called pistillate flower.

426. In guava, cucurbits flowers are:
(a) Hypogynous (b) Epigynous
(c) Perigynous (d) Both (a) and (b)

WB JEE-2008

Ans. (b) : In guava and cucumber inferior ovary is present i.e rest parts are present above the gynoecium.

427. In floral formula(K) denotes:
(a) Polysepalous (b) Gamosepalous
(c) Polypetalous (d) Gamopetalous

WB JEE-2008

Ans. (b) : Gamosepalous (the number of sepals in the calyx) is symbolized by the letter 'K' in a floral formula.

428. The arrangement of the ovules on the placentae developed from the central axis of the ovary is called:
(a) parietal placentation
(b) axile placentation
(c) basal placentation
(d) marginal placentation

J&K CET-2005

Ans. (b) : The arrangement of the ovules on the placenta developed from the central axis of the ovary is called axile placentation, ex- China rose, Lemon, Tomato.

429. The glumes are modified
(a) petals (b) sepals
(c) tepals (d) bracts

MP PMT-2013
Haryana PMT-2011

Ans. (d) : In the family Graminae at the base of spikelet 2 sterile or empty bract called the glume.
Bracts are specialized leaves present in axis of flower small, dry scaly bracts are called as glumes.
ex- Wheat and grass.
Glume is a scale at the base of each flower is spikelet. Glumes may be similar in form to the lemnas.

430. Perigynous flowers are found in :-
(a) Cucumber (b) China rose
(c) Rose (d) Guava

AIPMT-2015
Manipal-2010

Ans. (c) : Perigynous flower are found in rose. Perigynous, flowers are located on the rim of thalamus almost at the same level, the ovary here is said to be half inferior. This type of flowers are found in plum, rose, peach.
- In cucumber and guava epigynous flowers are found.
- Hypogynous flowers are present in China rose.

431. The partial floral formula of a flower is $K_{(5)}\ C_5\ A_{(\infty)}\ \underline{G}_{(5)}$. Which of the following set of information is conveyed here?
(a) Gamosepalous, polypetalous, syncarpous and superior ovary
(b) Polysepalous, polypetalous, syncarpous and inferior ovary
(c) Gamosepalous, gamopetalous, polycarpous and superior ovary
(d) Gamosepalous, polypetalous, syncarpous and inferior ovary

WB JEE-2014

Ans. (a) : A condition in flowers in which sepals are united or fused called as gamosepalous.
Polypetalous - having separate petals.
Syncarpous: A condition in which the carpels of the gynoecium are united in a compound ovary.

432. Which one of the following diagrams represents the placentation in Dianthus

(a) (b)

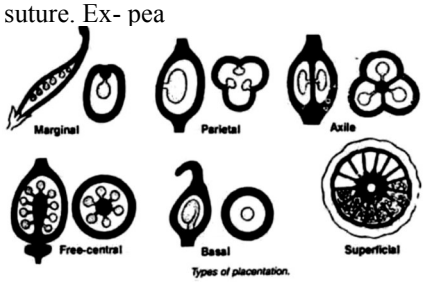
(c) (d)

AIPMT (Mains)-2011

@apna_pdf

Ans. (c) : Dianthus belongs to the family Caryophyllaceae that shows the free-central type of placentation.

- In this type of ovules are arranged on the central axis which is not attached with the ovary by any kind of septum.
- Parietal placentation is an arrangement in which ovules develop on the inner wall of the ovary. Ex- Brassica
- Marginal placentation is a type of placentation in which the placenta forms a ridge or margin along the ventral suture. Ex- pea



433. The example for trimerous, unisexual flowers is……..

(a) Tamarind (b) Pea
(c) Cocos nucifera (d) Hibiscus

Karnataka CET-2004

Ans. (c) : Cocos nucifera.

Trimerous flowers have floral organ three or in multiples of three and these are characteristicfeatures of monocots. The plant is dioceious and the flower are unisexual because staminate and pistillate flowers occurs separately on the different plants.

- Tamarind has bisexual and pentamerous flowers.
- Pea has bisexual flowers and pentamerous flowers.
- Hibiscus has bisexual flower and pentamerous flowers.

H. Part of Flower

434. Select the correct statements

I. Ovary, style and stigma are united in Hibiscus.
II. Loranthus show ategmic ovule
III. Geitanogamy is genetically similar to autogamy
IV. Entry of Pollen tube through the micropyle is called Mesogamy

(a) II and IV (b) I and II
(c) II and III (d) III and IV

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : • In some ovules nucellus is not enclosed by integuments these are called antegmic ovule, e.g.- Loranthus.

• Geitonogamy is functionally cross pollination involving a pollinating agent, genetically it is similar to autogamy since pollen grains come from the same plant.

• Entry of pollen tube though micropyle is called progamy. Mesogamy is the phenomenon of the entry of pollen tube into ovule through integument.

435. Match the following:

List-A		List-B	
A)	Stigma	I)	Style
B)	Seat of ovules	II)	Tip of the style
C)	Basal part of Gynocium	III)	Placenta
D)	Elongated tube	IV)	Ovary

A B C D
(a) IV, III IV, II
(b) IV, II III I
(c) IV, IV, III, I
(d) II, III, IV, I

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : The gynoecium is consist of pistils. Each pistil has three parts, the stigma, style and ovary. The tip of style is called stigma serves as landing platform of pollen grain. The basal bulged part of the pistil is ovary. The style is the elongated slender part between stigma and ovary. Placenta is located inside the ovarian cavity.

436. Name the cells of mature pollen grain when you observe under microscope with the following characters respectively.
(A) Bigger cell with abundant food reserve and large irregular shaped nucleus.
(B) Small, dense cytoplasm with nucleus.

(a) Generative cell, Gametes
(b) Vegetative cell, Gametes
(c) Vegetative cell Generative cell
(d) Generative cell, Vegetative cell

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : When pollen grain is mature it contains two cells, the vegetative cell and generative cell. The vegetative cell is bigger, has abundant food reserve and a large irregularly shaped nucleus. The generative cell is small and floats in cytoplasm of vegetative cell. It is spindle shaped with dense cytoplasm and a nucleus. In over 60 percent of angiosperms, pollen grain are shed at this 2-celled stage.

437. Stalk of the stamen is

(a) Petiole (b) Filament
(c) Peduncle (d) Pedicel

Karnataka CET-2022

Ans. (b) : The presence of long stalk in stamen is called filament. Filament provide support to anthers and they carry nutrients to anther where pollen develop.

Petiole - The stalk of the leaf when present leaf described as petiole. When absent leaf is called sessile petiole is winged, swollen, spongy.

In Acacia petioles are modified into green leaf like structure and perform the function of leaf called - phyllode.

Pedicel - The pedicel is a stalk or stem that supports a single flower. It connects the single flower to the inflorescence.

The flowers without pedicels are called sessile. (for example - sunflower).

Peduncle - The peduncle is the main stalk that supports a solitary flower or an inflorescence later it also supports the fruits.

@apna_pdf

438. In floral formula, 'K' and 'C' stands for ____.
(a) K - corolla, C - calyx
(b) K - calyx, C - corolla
(c) K - calyx, C - calyx
(d) K - corolla, C - corolla

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : In the floral formula, K stands for calyx and C stands for corolla.

439. (i) When carpels are free, they are called "A"
(ii) When the carpels fused, they are called "B"
Here, A and B refers to ————
(a) A– syncarpous, B– apocarpous
(b) A– apocarpous, B– syncarpous
(c) A– monocarpous, B– multicarpous
(d) A– multicarpous, B– monocarpous

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : Gynoecium is the female reproductive part of the flower. It is made up of one or more carpels. When carpels are free it is called as apocarpous as: Lotus, Rose.

When carpels are fused termed as syncarpus as: Tomato, Mustard.

440. When the stamens remain united with petals, then it is called
(a) Epipetalous (b) Episepalous
(c) Gynandrous (d) Synandrous

Tripura JEE-2021

Ans. (a) : Epipetalous is a condition when the filaments of stamens are attached to the petals of corolla. Corolla is the next cohort after calyx toward the apex composed of units called petals, which are typically thin, soft and colored to attract animals that help in the process of pollination.
Epipetalous condition found in Malvaceae and Solanaceae family.

441. Match the following lists.

List-I	List-II	List-III
A. Leathery Epicarp	i. Oblique growth	I. Cladophylls
B. Apocarpous gynoecium	ii. Limited growth branch	II. Papery mesocarp
C. Lateral branch of underground stem	iii. Superior ovary	III. Mesocarp of fruitlet is edible
D. Asparagus	iv. Aggregate fruit	IV. Chrysanthemum

The correct match is:-

	A	B	C	D
(a)	ii, I	iii, III	iv, IV	i, II
(b)	iii, II	iv, III	i, IV	ii, I
(c)	iii, II	ii, IV	iv, III	i, I
(d)	i, IV	iii, III	ii, II	iv, I

TS EAMCET-09.08.2021 Shift-II

Ans. (b) :

List-I	List-II	List-III
A. Leathery epicarp	Superior ovary	Papery Mesocarp
B. Apocarpous gynoecium	Aggregate fruit	Mesocarp of fruitlet is edible
C. Lateral branch of underground stem	Oblique growth	Chrysanthemum
D. Asparagus	Limited growth branch	Cladophylls

442. In angiospermic flowers, the filament of stamen is attached to the anther by_____.
(a) placenta (b) hilum
(c) funicle (d) connective

MHT CET-04.10.2020 Shift-I

Ans. (d) : In angiosperm flowers, the filament of stamen is attached to the anther by connective It is the portion of sterile tissue of the anther between and inter connecting the two thecae which forms a body with them and holds them together. Its function is supports, protects and gives structure to other tissues and organ in the body.

443. Stamens of a flower may be united with other parts such as petals or among themselves. Identify the correct statements from the following
i. The stamens are united into one bunch as in pea
ii. The stamens that are attached to the petals, are called epipetalous as in brinjal
iii. The stamens are united into more than two bundles as in china rose
iv. Stamens are attached to the perianth in lily
The correct is:
(a) ii, iv (b) i, iii
(c) ii, iii (d) iii , iv

TS EAMCET-09.05.2019 Shift-I

Ans. (a) : (i) The stamens are united in two bundles, called diadelphous condition, as is in pea.
(ii) Epipetalous stamens are those in which stamens are attached to the petals.
(iii) The stamens are united in one bundle, called monadelphous condition as in China rose.
(iv) In perianth, each floral part is known as tepals. When the stamen is attached or adnate to petals is called epiphyllous. The following condition is observed in lily.

444. Match the placental types (column-I) with their examples (column-II).

Column-I	Column-II
(A) Basal	(i) Mustard
(B) Axile	(ii) China rose
(C) Parietal	(iii) Dianthus
(D) Free central	(iv) Sunflower

Choose the correct answer from the following options :
(a) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(d) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)

NEET (Odisha)-2019

Ans. (d) : Basal – Sunflower
Basal : The ovary is unilocular and a single ovule is born at the base of ovary.
2) **Axile – China rose**
Axile: It is found in multicarpellary syncarpous gynoecium. The fusion margin of carpels grow in whorl and meet in the centre of the ovary.
3) **Parietal – Mustard**
Parietal – This placentation is found in the unilocular syncarpous ovary. In this type of placentation the ovule develops on the inner wall of the ovary or on the peripheral part.
4) **Free central – Dianthus**

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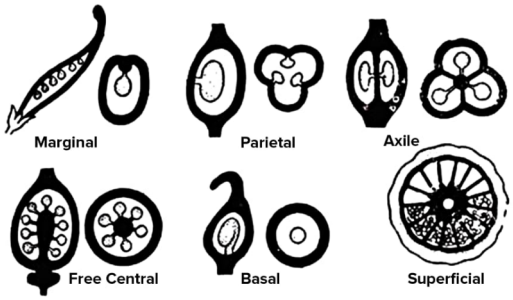
Free central placentation found in syncarpous gynoecium. In it the ovary is unilocular and the ovules are borne on the axis in the centre of the ovary.



445. Where the pollen grains are develop in anther during microsporogenesis?
(a) Epidermis (b) Sporogenous tissue
(c) Endothecium (d) Tapetum

GUJCET-2018

Ans. (b) : Young anther of plant contains sporogenous tissue. An anther lobe has 4 cavities (pollen sac) and has outer most epidermis. Pollen grains develops from sporogenous tissue in angiosperms. Pollen grains develop in the anthers of the stamens.
(a). Epidermis – The epidermis play a protective role in anther development.
(c). Endothecium – The endothecium is responsible for anther dehiscence to dispersed pollen when they are mature.
(d).**Tapetum –** Tapetum provides nutrition for developing microspore development and material for pollen wall formation.

446. Monadelphous condition of stamens is found in
(a) pea (b) China Rose
(c) Citrus (d) none of the above

Tripura JEE-2018
AMU-2015
Rajasthan PMT-1997

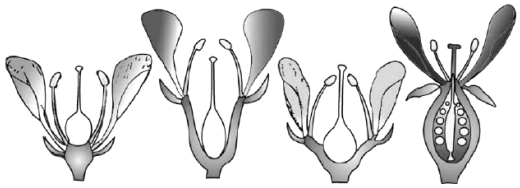
Ans. (b) : Monadelphous:- When stamens of a flower are united as a tube around the style of the carpel. It is the characteristic feature of family malvaceae.
example:- China rose
• The stamens are arranged in bundles of two in the pea flowers and it is termed diadelphous.
• Citrus has polyadelphous stamens.

447. Example for a monadelphous androecium is
(a) Pisum (b) Solanum
(c) Dracaena (d) Crotalaria

TS EAMCET-02.05.2018 Shift-I

Ans. (d) : Monadelphous androecium is found in Crotalaria, family fabaceae.
In monadelphous androecium, all the filaments are united in a single bundle but anthers are free from each other.

448. Diagram of hypogynous, perigynous, epigynous are given respectively



(A) (B) (C) (D)

Find out the correct option for the above diagrams a,b,c,d that has correct examples
(a) A–Mustard, B–Rose, C–Plum, D–Guava
(b) A–Cucumber, B–Plum, C–Rose, D–Brinjal
(c) A–China rose, B–Guava, C–Rose, D–Mustard
(d) A–Mustard, B–Rose, C–Plum, D–Brinjal

AIIMS-27.05.2018 Shift-II

Ans. (a) : The diagram of flowers are mentioned as hypogynous, perigynous and epigynous are arranged in respectively manner.
(A) Mustard- The flowers are hypogynous i.e. occupies the highest position while the other part are situated below it. In such flowers, the ovary is said to be superior.
For e.g., China rose and Brinjal.
(B) Rose- The flowers are perigynous. The ovary here is said to be half inferior.
For e.g., Plum, Rose and Peach.
(C) Plum- The flowers are perigynous, i.e., gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus. The ovary is said to be half inferior.
For e.g., Rose, Plum and Peach.
(D) Guava- The flowers are epigynous i.e. the margin of thalamus grows upward enclosing the ovary completely and getting fused with it, the ovary is said to be inferior.
For e.g., Cucumber, Guava and the Ray florets of Sunflower.

449. Assertion (A) : Herkogamy is common in Datura plants.
Reason (R) : In Herkogamy, anther and stigma are placed at different positions so that the pollen cannot come into contact with the stigma of the same flower.
Which of the following is true?
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : The anthers and stigma are physically separated from each other by means of a barrier or simply by space eg: Lima beans, Calotropis. In Datura plants herkogamy is not occurs.
Herkogamy: Herkogamy is one of the strategies adapted by many bisexual plants to avoid self-pollination.

450. Intercalary meristem occurs in:
(a) mint (b) grasses
(c) both (a) & (b) (d) none of these

J&K CET-2004

Ans. (c) : Intercalary meristem occurs in mint, grasses.
Intercalary meristem: It is a type of primary meristematic tissue containing cells that can divide and promote the growth of the plant. They are located at the base of internode.
Function: Promote the lengthening of the stem and increase the height of the plant.

@apna_pdf

451. Indentify the plant which is not having unilocular ovary

(a) Cucumber (b) Cashew
(c) China rose (d) Chilli

TS EAMCET-2015

Ans. (c) : The locules refer to the chamber or cavities in the ovary. China rose belongs to the family Malvaceae, the gynoecium is pentacarpellary with syncarpous ovary having many locule, so the ovary is multilocular with the axile placentation, hence the correct answer is china rose.

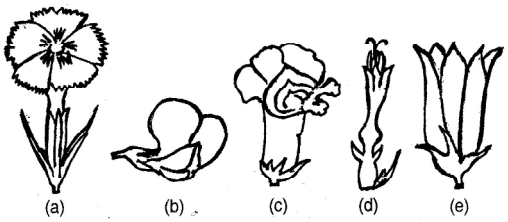
452. Perianth is reduced to lodicules in

(a) Liliaceae (b) Poaceae
(c) Orchidaceae (d) Musaceae

Uttarakhand PMT-2011

Ans. (b) : Perianth: Perianth is a non productive & vegetative part of a flower that protects and supports the reproductive parts. Sepal and petal do not take part in reproduction but just support reproduction, hence they are a part of perianth.
ex: Lily, Onian etc.
Perianth occur in family Poaceae, the perianth is reduced and represented by lodicules.

453. The correct sequence of types of corolla in the figure given below is



(a) (a) caryophyllaceous (b) papilionaceuos (c) bilabiate (d) tubular (e) bell-shaped
(b) (a) papilionaceuos (b) bilabiate (c) tubular (d) bell-shaped (e) caryophyllaceous
(c) (a) bilabiate (b) papilionaceous (c) caryophyllaceous (d) bell-shaped (e) tubular
(d) (a) caryophyllaceuos (b) bilabiate (c) papilionaceuos (d) tubular (e) bell-shaped
(e) (a) tubular (b) bell-shaped (c) caryophyllaceous (d) bilabiate (e) papilionaceus

Kerala PMT-2008

Ans. (a) : Caryophyllaceous: When five petals are clawed and have their limbs spreading outside.
Papillionaceous: It is an irregular, polypetalous corola with its five petals arranged so as to resemble a butterfly
Bilabiate: A bilabiate (means two lipped) corolla is a zygomorphic, sympetalous corolla with the limb divided in two lips. Lamiaceae (the mint family) have bilabiate corollas.
Tubular corolla: They are regular, gamopetalous corolla with their petals fused to form a tube as in disc floret of compositae.
ex: Asteraceae family
Bell shaped: Bell shaped corolla is called campanulate.
Corolla tubes have a bell- shaped base that gradually widens upward.
It is observed in Physalis plant, various cucurbita and the Campanulaceae family

454. Which of the following are technically not correct names for a floral whorl?

I. Androecium
II. Carpel
III. Corolla
IV. Sepal

(a) I and IV (b) III and IV
(c) II and IV (d) I and II

Assam CEE-2014

Ans. (c) : A flowering plant consist of four whorls - calyx, corolla, androecium and gynoecium.
Technically carpel and sepals are incorrect names for a floral whorl.

455. Persistent calyx forming a cover around the fruit is found in :

(a) Argemone mexicana
(b) Ageratum conyzoides
(c) Withania somnifera
(d) Brassica campestris

Uttarakhand PMT-2006

Ans. (c) : Persistent calyx forming a cover around the fruit is found in *Withania somnifera*.
It is a characteristic feature of family Solanaceae.
When the ovary transforms into a fruit and floral parts wither away, but in the family of Solanaceae.
Sepals persist even after fruit formation, such a calyx is said to be persistent.

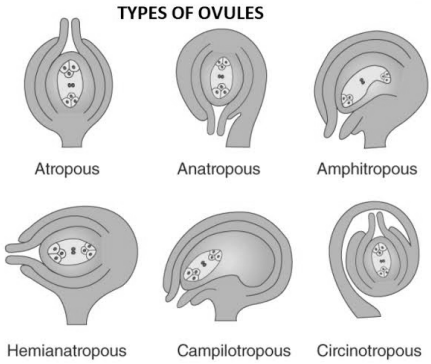
456. An ovule which becomes curved so that the nucellus and embryo sac lies at right angles to the funicle is :-

(a) Campylotropous (b) Anatropous
(c) Orthotropous (d) Hemitropous

AIPMT-2004

Ans. (d) : An ovule which becomes curved so that the nucellus and embryo sac lies at right angles to the funicle is a hemitropous ovule. The body of the ovule is placed transversely at right angles to the funicle and the micropyle and chalaza lie in one straight line in hemitropous ovules.

- Ovule have been separated into (6) categories based on their shapes.



457. Pappus is modified

(a) calyx (b) corolla
(c) bracts (d) gynoecium

BHU PMT (Screening)-2005
JIPMER-2010

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Ans. (a) : The Pappus is modified calyx or sepals. In Asteraceae the pappus is the part of an individual floret that surrounds the base of the corolla tube in flower.

458. Trimerous flower, superior ovary and axile placentation is characteristics of

(a) Liliaceae (b) Cucurbitaceae
(c) Solanaceae (d) Compositae

JIPMER-2010

Ans. (a) : Trimerous flower, superior ovary and axile placentation is characteristics of Lilliaceae. The plants owned by this family are monocotyledonous plants. They are extensively distributed worldwide.
Trimerous flowers have floral appendages or whorls in threes, like three petals, three sepals etc. In axile placentation the placenta is present in axial position and the ovules are attached to in the multilocular ovary.

459. In a tetradynamous androecium, one of the following is seen.

(a) Outer whorl of four smaller stamens and inner whorl of two larger stamens
(b) Outer whorl of two larger stamens and inner whorl of four smaller stamens
(c) Outer whorl of four larger stamens and inner whorl of two smaller stamens
(d) Outer whorl of two smaller stamens and inner whorl of four larger stamens

JCECE-2010

Ans. (d) : The common name of *Brassica campestris* is mustard.
It is a characteristic of Brassica family and found in *Brassica campestris*. Tetradynamous is a floral condition in which the flower contains 6 staments out of which 4 are longer and two are shorter.

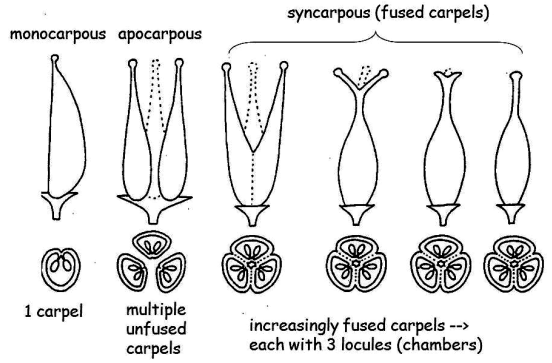
460. Match column I with column II and select the correct option using the codes given below.

Column-I		Column-II	
A.	**Pistils fused together**	**1.**	**Gametogenesis**
B.	**Formation of gametes**	**2.**	**Pistillate**
C.	**Hyphae of higher ascomycetes**	**3.**	**Syncarpous**
D.	**unisexual female flower**	**4.**	**Dikaryotic**

(a) A-4 B-3C-2D-1 (b) A-2 B-1 C-4 D-3
(c) A-1 B-2 C-4 D-3 (d) A-3 B-1 C-4 D-2

NEET-2016 Phase-II

Ans. (d) : Syncarpous is the condition in which carpels of the gynoecium unite to form compound ovary.
It also contains more than one carpel and carpels are fused.



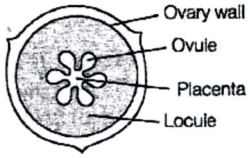
- Gametogenesis is the process of formation of gametes. It is of two types: Microsporogenesis (formation of male gametes) and Megasporogenesis (formation of female gametes).
- Hyphae of higher ascomycetes are dikaryotic in nature.
- Pistillate are unisexual flowers consisting of only carpels or pistils. They do not have stamens.

461. Free-central placentation is found in.

(a) Dianthus (b) Argemone
(c) Brassica (d) Citrus

NEET-2016 Phase-II
Rajasthan PMT-2011

Ans. (a) : Dianthus shows free central placentation in its ovary. In such ovary, ovules are attached on the main axis of the placenta.
- Argemone and Brassica show parietal placentation in which ovules develop on the inner wall of the ovary or on the peripheral part.
- **Citrus** fruits shows axile placentation in which the ovules are borne to the central placenta.



Free-central placentation

462. The term 'polyadelphous' is related to

(a) gynoecium (b) androecium
(c) corolla (d) calyx

NEET-2016 Phase-II

Ans. (b) : Polyadelphous stamen :– Filaments are united forming a number of bundles but the anthers remain free.
e.g.- Lemon.
- Polyadelphous is the condition in which stamens are present in more than two groups but their anthers are seperate. It is found in Castor, Citrus, Bombax, Myristica malabarica etc.
- Monadelphous stamen, Filaments of all stamens are united forming a single bundle but the anthers are free.

e.g.- Cotton.
- Diadelphous stamens have Filaments which are united forming a number of bundles and anthers are free. e.g.- Pea.

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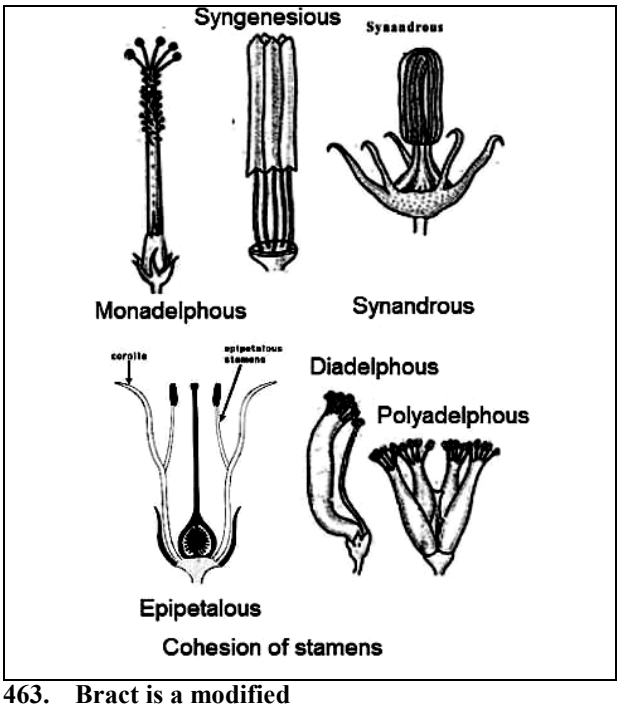


463. Bract is a modified
(a) petal (b) sepal
(c) leaf (d) involucre

UP CPMT-2009

Ans. (c) Bracts are usually, different from foliage leaves, they may be smaller larger or a different color, shape or texture.
Bract is modified or specialized leaf, especially one associated with a reproductive structure such as a flower, inflorescence axis or cone scale.

464. Long filamentous threads protruding at the end of a young cob of maize are-
(a) Anthers (b) Styles
(c) Ovaries (d) Hairs

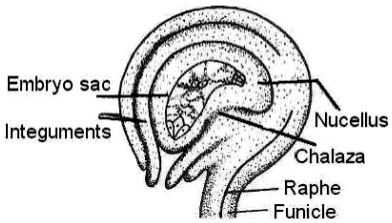
AIPMT-2006

Ans. (b) : In maize the male inflorescence occupies the terminal position on the main axis, whereas the female inflorescence (ear or cob) is borne on modified lateral branches in the axils of leaves.
The ear producing branch has short internodes and bears a female spike at its apex. Each spikelet has a pair of small membranous glumes and two florets.
The feathery styles of the female florets are long and emerge out of the cobs to expose stigma for wind pollination.

465. Which one of the following represents an ovule, where the embryo sac becomes horse- shoe shaped and the funiculus and micropyle are close to each other –
(a) Amphitropous (b) Anatropous
(c) Circinotropous (d) Atropous

AIPMT-2005

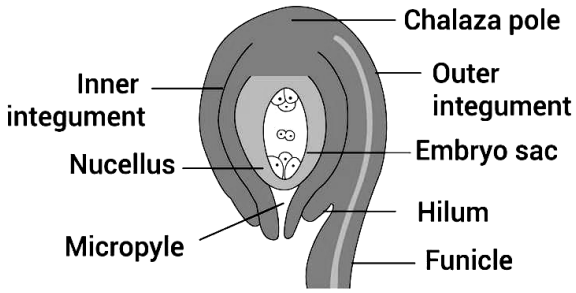
Ans. (a) : The condition of amphitropous ovule, the embryosac become horse-shoe shaped and the funiculus and micropyle are closed to each - other as in Alismataceae, butomaceae families.



466. What is the direction of micropyle in anatropous ovule :-
(a) Upward (b) Downward
(c) Right (d) Left

AIPMT-2002

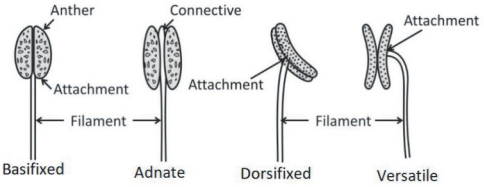
Ans. (b) : In the anatropous ovule the micropyle is inverted so the micropyle in the lower side (downward). It is closer to the hilum. Get rotated 180º, the funicle lies parallel to the body of ovule and micropyle. The Chalazal end present at the top.



467. When the filament runs along the back of anther, it is called
(a) Adnate (b) Longitudinal
(c) Versatile (d) Syngenecious.

AIIMS-2002

Ans. (a) : The attachment of filament to the anthers determines the classification of stamens. When the filament is attached along the entire/Whole length of the anther, it is called adnate. It is seen in **Nicotiana, Magnolia, Mechelia (Champa).**
- In dorsifixed condition, filaments are attached to the dorsal side of the anthers.
- In basifixed condition, filaments are attached to the base of the anthers.
- In versatile condition, filaments are attached to a point on the connective so that anthers can swing freely.



468. Clove is a part of
(a) Flower bud
(b) Thalamus of a flower
(c) Auxiliary bud
(d) Seed.

AIIMS-2001

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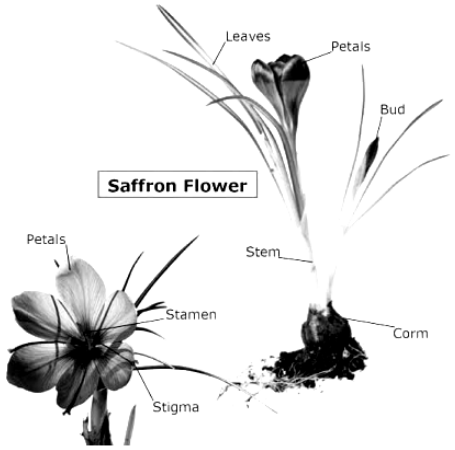
Ans. (a) : The highly priced, medicinally valued clove is an aromatic flower bud of *Syzygium aromaticum* of the family Myrtaceae.
• Cloves are the aromatic flower buds of a tree.
• It is commonly used as spices, flavoring or fragrance agent in consumer products, like toothpaste etc.

469. Saffron or kesar is extracted from:
(a) entire carpel
(b) seeds and calyx
(c) stamens and petals
(d) top of the style and stigma

J&K CET-2000

Ans. (d) : Saffron or kesar is extracted from top of the style and stigma. The style & stigma of crocus plant are called saffron. These are used as condiments. The vivid crimson stigma & style are called threads, are collected and dried for use mainly as a coloring ingredient in food.



470. The condition in which gynoecium occupy lower position while other flower parts are situated on or above thalamus, the flower is termed as
(a) epigynous (b) perigynous
(c) hypogynous (d) superior

BVP-2014
Uttarakhand PMT-2006

Ans. (a) : The condition in which gynoecium occupy lower position while other flower parts are situated on or above thalamus, the flower is termed as epigynous.
In perigynous flower the thalamus is expanded to become disc shaped, cup shaped with androperianth being attached to the margins.
Ex- Pea, Rose etc.
In the hypegynous flower gynoecium occupies the highest position while the other parts are situated below it.
Ex - China rose, mustard, brinjal etc.

471. The plant having monadelphous stamens and axile placentation is :
(a) Lemon (b) Pea
(c) Tomato (d) Cucumber
(e) China rose

Kerala PMT-2011

Ans. (e) : The plant having monadelphous stamens and axile placentation is China rose. In this condition of flowers all the filaments of stamens are united in single bundle to form a tube like structure but anthers remain free. ex.– China rose.
It is a characteristic feature of Malvaceae family.

472. The example for polypetalous, zygomorphic corolla is:
(a) Ocimum (b) Crotalaria
(c) Rose (d) Mustard

Karnataka CET-2001

Ans. (b) : The example for polypetalous, zygomorphic corolla is Crotalaria.
Crotalaria is a plant of family leguminaceae or fabaceae, sub family papilionoideae, in which presence of polypetalous & zygomorphic corolla is the characteristic feature of this family.

473. Role of calyx and corolla in fruit formation is
(a) promotory (b) ineffective
(c) essential (d) all of these

Rajasthan PMT-2003

Ans. (a) : During fruit maturation, the fruiting calyx expands and inflates, enveloping the fruit entirely.
Corolla color or size can influence pollinators attraction, with bright or large flowers attracting more pollinators than dark or small flowers. Their role in fruit formation is promotory.

474. The edible part of cauliflower is
(a) mesocarp (b) cotyledons
(c) endosperms (d) inflorescence

UP CPMT-2004

Ans. (d) : Cauliflower belongs to the species Brassica oleracea from the family Brassicaceae. It is a seed reproducing annual herbaceous plant. The edible part of cauliflower is the inflorescence which we use as a vegetable.

475. In some plants, anthers and stigma grow and mature at same time. This phenomenon is called:
(a) Homogamy (b) syngamy
(c) allogamy (d) fusion

AFMC-2005

Ans. (a) : In **homogamy,** the anther and stigma of bisexual flowers of some plants mature at the same time. They are brought close to each other to ensure self-pollination.
Syngamy means fusion of gametes syngamy is the phenomenon in which male gamete fuses with egg in the embryosac of flowering plants.
Allogamy refers to the movement of the pollen grains from the anther of one plant to the stigma of a flower of another member of the same species. It is a type of cross fertilization.

476. The thorn of water chestnut (Trapa bispinosa) is the modification of :
(a) Petals (b) Sepals
(c) Stamens (d) Style

Rajasthan PMT-1996

Ans. (b) : Water chestnut (Trapa bispinosis) is an annual plant with a submerged stem 12-15 feet long that has fine roots that anchor it to the soil.
The fruit of water chestnut is a drupe which develops from a ripened ovary.
All parts of the flower (styles, stamens, and petals) are shed off while the fruit develops and just the sepals remains which get modified to form thorns (spines).

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477. The nature of a fruit developing from a flower depends on the type of:
(a) gynoecium (b) pollination
(c) fertilization (d) androecium
Karnataka CET-2002

Ans. (a) : The nature of a fruit developing from a flower depends on the type of gynoecium . It is the female reproductive portion as well as the innermost whorl in a flower. Carpel is the main component of gynoecium that consists of ovary, style and stigma.

478. The expression gynoecium is apocarpous implies that the
(a) gynoecium comprises only one pistil which is fused with the stamen
(b) gynoecium comprises more than one carpel which are free from each other
(c) gynoecium comprises only one carpel which is free
(d) gynoecium comprises more than one carpel which are fused
DUMET-2010

Ans. (b) : The expression gynoecium is apocarpous implies that the gynoecium comprises more than one carpel which are free from each other.

479. The spice saffron is obtained from which one of the following?
(a) Corolla (b) Stamen
(c) Stigma (d) Tender tip of leaf
BHU PMT (Screening)-2010
Haryana PMT-2009
CG PMT-2009

Ans. (c) : *Crocus sativus* (saffron) belongs to the family Iridaceae. It is a rhizomatous herb. The dried stigma and top of style make the saffron of commerce. The product is obtained from the stigmas of the flowers, 4000 of which are required to produce 25 gm of saffron.

480. A funnel shaped stigma is found in
(a) Grasses (b) Crocus
(c) Malvestrum (d) Papaver
AMU -2000

Ans. (b) : A funnel shaped stigma is found in Crocus.
- Crocus sativus is the member of family Iridaceae. It is a perennial plant that contain an underground connector, bearing sessile, linear and sheathing leaves.
- **In grasses,** stigma are two in number and feathery. They arise directly from wall of ovary as style is generally absent or short.

481. If both the anthers and filaments are fused together to form a compact structure with sigmoid appearance the condition is termed a
(a) Syngenesious (b) Androecious
(c) Syngynandrous (d) Synandrous
AMU -2000

Ans. (d) : In synandrous condition both the anthers and filaments are fused together to form a compact structure with sigmoid appearance the condition is termed a Synandrous. Ex- Cucurbits.

482. Boat shaped anterior petal in garden pea is called:
(a) wing (b) alae
(c) keel (d) ship
HP CET-2013
Haryana PMT-2001

Ans. (c) : Boat shaped anterior petal in garden pea is called keel. Pea belongs to the family Fabaceae and sub family Papilionaceae. The flowers of pea are characterized with the butterfly shaped corolla which have five petals. The posterior petals is largest and is called as standard or vexillum.

483. Heterospory, seed habit is often exhibited by a plant possessing:
(a) bract (b) spathe
(c) petiole (d) ligule
HP CET-2013
Haryana PMT-2000

Ans. (a) : Heterospory, seed habit is often exhibited by a plant possessing bract. Heterospory means production of two different sizes of spores megaspores and microspore. All bryophytes are homosporous. Heterospory originated in some pteridophytes like Selaginella.

484. Number of carpels in Sida cordifolia is always:
(a) equal to the number of styles
(b) equal to the number of locules
(c) double the number of styles
(d) half the number of locules
AP EAMCET-2003

Ans. (b) : The number of carpels in Sida cordifolia is always equal to the number of locules.
It is the member of family Malvaceae.

485. Which one of the following floral characters, is shared by Ruscus and ray florets of Tridax?
(a) Nature of Perianth (b) Unisexuality
(c) Zygomorphy (d) Number of stigmas
AP EAMCET-2003

Ans. (b) : Ruscus is a member of family Liliaceae. It has unisexual flowers. Ray florets of Tridax are also unisexual flowers. Thus, unisexuality is the floral character of Tridax.

486. Which of the following statements is correct?
(a) Replum is found in the ovary of Pisum
(b) The anthers are introrse in Hibiscus
(c) The ovules are pendulous in Nelumbo
(d) Lateral style is found in Ocimum
AP EAMCET-2003

Ans. (c) : The family Nymphaeaceae is characterized by the possession of bitegmic anatropous ovules.
In *Nelumbo nucifera* and Cabomba the ovules are pendulous.
- Replum is a false septum formed due to the ingrowth of parietal placenta is mainly seen in the ovary of flowers of Brassicaceae (Cruciferae) family e.g, - Mustard, Candytuft etc.
- In Hibiscus, numerous anthers stick out from the filament almost like the feathers on a feather cluster.
- Lateral style is not found in Ocimum.

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487. What is the location/position of the multilayered sterile tissue in the transverse section of a young anther?
(a) Between the cells of sporogenous tissue
(b) Between tapetum and sporogenous tissue
(c) Between tapetum and endothecium
(d) Between epidermis and endothecium
VMMC-2014

Ans. (c) : These only middle layers are sterile and multilayer thickened and it is located between tapetum and endothecium.
Anther wall of young anther show layers from outside to inside in a transverse section, epidermis, endothecium, middle layers and a tapetum layer.

488. Gynobasic style is found in :
(a) Centella (b) Colocasia
(c) Ranunculus (d) Ocimum
JIPMER-2000

Ans. (d) : Gynoecium forms the female reproductive part of the flower. Ovary is the enlarged basal part, on which lies the style. The style connects the ovary to the stigma.
• The condition when the ovary is lobed and the style emerges from the base of the lobe of the ovary, then style is called as gynobasic style. It is seen in the family Lamiaceae or Labiatae

489. Diadelphous condition is found in :
(a) Mimosa (b) Helianthus
(c) Cassia (d) Pisum
JIPMER-2001

Ans. (d) : Diadelphous condition is found in Pisum sativum. It belongs to the family Fabaceae or Papilionaceae or Leguminosae.
In diadelphous condition, the filaments of nine stamens are united into one bundle and tenth posterior stamen stand apart.
ex - Pea (*Pisum sativum*).

490. The position of the odd sepal in Caesalpiniaceae is:
(a) posterior (b) anterior
(c) lateral (d) oblique
AP EAMCET-2001

Ans. (b) : The position of the odd sepal in Caesalpiniaceae is in the anterior condition.
Caesalpiniaceae is a subfamily of the Fabaceae or Leguminosae family. It is a heterogeneous group of plants with about 160 genera and some 2000 species.
Ex- Soybean, Pea, Common bean, Chickpea, Peanuts etc.

491. When margin of thalamus grows upward enclosing ovary completely and getting fused with it and the other parts of flower arise above the ovary, the flower is said to be
(a) hypogynous (b) perigynous
(c) epigynous (d) inferior
AMU-2012

Ans. (c) : When the margin of thalamus grows upward enclosing the ovary completely and getting fused with it and the other parts of the flower arise above the ovary, such flowers are called epigynous flowers and this type of ovary is said to be inferior.
Ex- Flowers of guava and cucumber and the ray florets of sunflower.

492. In obdiplostemonous androecium the stamens are arranged in:
(a) one whorl and alternate with petals
(b) two whorls with outer whorl alternate with petals
(c) two whorls with outer whorl opposite to the petals
(d) one whorl and opposite to the petals
AP EAMCET-2002

Ans. (c) : This condition is seen in Dianthus. When the stamens of outer whorl alternate with the representatives of the first whorl opposite the petals and those of the second whorl.
Therefore stamens and petals as twice in many flowers, which are opposite the petals in the outer set.

493. In a population of a species, in some plants the style is shorter, but in some others it is longer than the stamens. This conditions is called.
(a) heterostyly (b) homostyly
(c) homogamy (d) heterogamy
AP EAMCET-1997

Ans. (a) : The floral form with reciprocal differences in the length of the style and stamens to prevent self fertilization, condition is called heterostyly.
- The condition in which flowers of the same species have - styles of equal length is called Homostyly
- The condition of having stamens and pistils mature at the same time called homogamy.
- The condition in a flowing plant species having two or more types of flowers is called heterogamy.

494. A stalk like structure found above the stamens and below the ovary is called:
(a) gynophore (b) androphore
(c) flower stalk (d) filament
AP EAMCET-1997

Ans. (a) : Gynophore can be defined as the stalk structure of the flower which support the female reproductive parts or gynoecium, where the androphore is the stalk or column that supports the stamens or male reproductive parts of the flower. The example of gynophores include Telopea and the example of androphore include Sphenophora

495. Sepals (Calyx) are modified into wings in the fruits called samaroid. One such example is
(a) Shorea (sal) (b) Dodonaea
(c) Acer (d) Morenga
VMMC-2008

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Ans. (a) : The example of samaroid is Shorea (Sal).
In Shorea calyx is persistent and modified into wings in the seeds. Wings help in dispersal of seed.

496. Dispersal of fruits in opium (poppy) occurs through shaking by wind by
(a) Explosive mechanism
(b) Parachute mechanism
(c) Censor mechanism
(d) Jacular mechanism

VMMC-2008

Ans. (c) : In poppy dispersal occurs by censor mechanism. In this type of dispersal seeds are disperse out of the fruit because the latter either change down or bear long stalk which is shaken by the wind.
Parachute mechanism- The appendages develops in the fruits and seeds and various parts of the body are modified and act as parachute.

497. The condition in which gynoecium occupy topmost position of thalamus, the flower is
(a) inferior (b) epigynous
(c) perigynous (d) hypogynous

BVP-2013

Ans. (d) : When the other flower parts are arranged at the base of gynoecium, i.e. gynoecium occupy the topmost position it is hypogynous flower and in this condition the ovary is termed as superior.
• When the ovary is placed below to the other floral organs, it is said to be an inferior ovary. The thalamus appears cup-shaped or hollow. Such flowers are called epigynous flowers as seen in cucumber and other cucurbits.
• When the ovary is half-superior, the flowers are called perigynous.

498. In Benincasa the condition of androecium is described as:
(a) diadelphous (b) polyadelphous
(c) synandrous (d) syngenesious

AP EAMCET-2000

Ans. (c) : When stamen are united with each other the it is called synandrous condition. This condition is found in Benincasa (ash gourd) which is a member of family Cucurbitaceae.
Syngenesious is a condition, in which filament are free but anthers are fused together eg.- Ageratum, disc florets of sunflower.
Diadelphous is a condition in which stamens are united to form two groups. It is found in the member of the Fabaceae family.

499. To which of the following the sepals, petals, stamens and carpels are in the ratio of 2:2:3:1?
(a) Brassicaceae (b) Asteraceae
(c) Solanaceae (d) Liliaceae

AP EAMCET-2000

Ans. (a) : Brassicaceae family has the actinomorphic flowers with 4 sepals in two whorls with imbricate aestivation and 4 cruciform corolla.
• In valvate aestivation eg.- mustard, radish. Cruciform corolla is when the petals are free, known as polypetalous, and the petals are four diagonally located to form a cross. The tetradynamous stamens contain four large inner stamens and two small outer stamens.
• In gynoecium sometimes two carpels are separated by a false partition called replum, so we will consider it as a single carpel.
• Thus in Brassicaceae family the sepals, petals, stamens and carpels are in the ratio of 2:2:3:1.

500. Ovary is half – inferior in the flower of
(a) Apple (b) Guava
(c) Peach (d) Garlic

Rajasthan PMT-2011

Ans. (c) : Ovary is half-inferior/ semi inferior if with the place of insertion of other floral parts are at same level ex- Peach.
Guava- Inferior ovary.
Apple- Inferior ovary.
Garlic- Superior ovary.
Half inferior or half superior (position of ovary) found in Perigynous flower of family Leguminaceae.

501. The term keel is used for special type of
(a) Sepals (b) Petals
(c) Stamens (d) Carpels

Rajasthan PMT-2011

Ans. (b) : The term keel is used for a special type of petal found in the Papilionaceae family.
Papilionaceous or butterfly shaped corolla is characteristic of family Papilionaceae. There are five petals, out of them one posterior is larger called vexillum or standard, two lateral are called wings or alae and two anterior small fused petals called keel or carina.

502. Polyadelphous stamens are found in
(a) Cotton (b) Sunflower
(c) Grain (d) Lemon

Rajasthan PMT-2011

Ans. (d) : Polyadelphous stamens are found in lemons. The filaments are usually free but in citrus the filaments of numerous stamens are united in several bundles called the polyadelphous condition.

503. Perianth is represented by
(a) nines (b) lemma
(c) lodicules (d) palea

Rajasthan PMT-2009

Ans. (c) : In family- Gramineae (Poaceae) the perianth is represented by membranous scales called lodicules. The lodicules are situated above and opposite the superior Palea.
Palea is the bands that develop on the receptacle of a complex flower. Rice is an example of Palea that is bent and facing the lemma.
In grass, the lemma is one of the specialized bracts that surround the florets.

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504. Proximal end of the filament of stamen is attached to the

(a) Thalamus or petal (b) Anther
(c) Connective (d) Placenta

NEET-2016 Phase-I

Ans. (a) : Proximal part of a filaments means the part which is nearest to the point of attachment and the filament of stamen is attached to the thalamus of the flower or sometimes it is attached to the flower petals. (epipetalous)

- A **sterile** stamen which is not capable of producing pollen is known as a staminode, e.g.- in Stellaria the size of the staminode is very small and it lies inside the innermost whorl of the flower.
- **Placenta-** Ovules are attached to the inner wall of ovary.
- **Anther -** The part of the stamen where pollen is produced

505. The technical term used for the androecium in a flower of China rose (*Hibiscus rosa sinensis*) is

(a) Monadelphous (b) Diadelphous
(c) Polyandrous (d) Polyadelphous

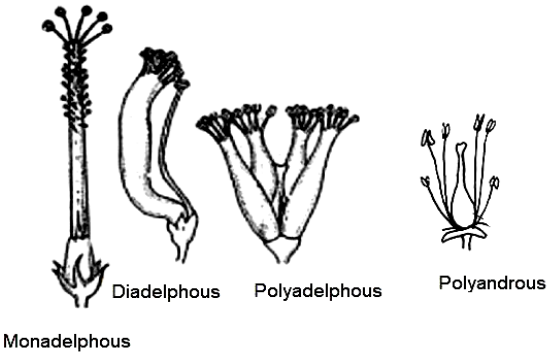
AIPMT (Screening)-2010

Ans. (a) : China rose family shows cohesion of stamen by union of filaments into single bundle known as **monadelphous**. The androecium in China rose is monadelphous.

Polyadelphous flowers are those in which the stamens have united filaments and are fused in two or more groups. A flower having the stamens jointed by their filaments into several separate bundles e.g.- Citrus.

Diadelphous flowers are those in which the filament of the stamens fused and form into two bundles e.g.- family fabaceae.

Polyandrous when the stamens of a flower are free the condition is called polyandrous e.g. - Petunia.



506. Wearing isolated a dormancy inducing substance from the leaves of a plant. From which type of gynoecium does the fruit of that plant develop?

(a) Bicarpellary syncarpous gynoecium with inferior ovary
(b) Bicarpellary syncarpous gynoecium with superior ovary
(c) Tricarpellary syncarpous gynoecium with superior ovary
(d) Monocarpellary gynoecium with half inferior ovary

AP EAMCET-2007

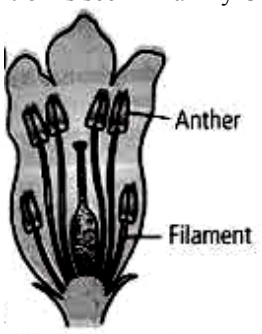
Ans. (b) : In this plant gynoecium is bicarpellary syncarpus, ovary superior. In pistillate flower the ovary is superior (hypogynous) , sessile , bicarpellary and syncarpous in nature.
Wearing isolated a dormancy inducing substance from the leaves of a Platanus occidentalis which belong to the family Plantanaceae.

507. In a tetradynamous androecium, one of the following is seen

(a) Outer whorl of 4 smaller stamens and inner whorl of 2 larger stamens
(b) Outer whorl of 2 larger stamens and inner whorl of 4 smaller stamens
(c) Outer whorl of 4 larger stamens and inner whorl of 2 smaller stamens
(d) Outer whorl of 2 smaller stamens and inner whorl of 4 larger stamens

AP EAMCET-2007

Ans. (d) : In a tetradynamous androecium, outer whorl is of 2 smaller stamens and inner whorl is of 4 larger stamens. This condition is seen in family Cruciferae.



Tetradynamous stamens

508. Carina is

(a) Outermost two petals of pea flower
(b) A boat shaped structure of petals
(c) The innermost two petals that are suppresed together
(d) Both [b] and [c]

VMMC-2013

Ans. (d) : Papilionaceous corolla is the unique aestivation found in the Papilionaceae family.
Carina is another name of keel, which is fused petals of fabaceae family. Carina having C- shaped or boat shaped structure of petals.

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I. Aestivation

509. Example for twisted aestivation.

(a) calotropis (b) Cotton
(c) Pea (d) Bean

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : Twisted aestivation. is present cotton, ladyfinger, Hibiscus, and Chinarose.

Twisted aestivation : - in twisted aestivation, one edge of petal covers the adjacent petal while the other Border is coverd by another petal.

The margin of one petal overlap those of next and the margins of the next overlap those of the.

- Calotropis → Valvate aestivation.
- Pea + bean vaxillary aestivation.

510. Choose the correct statement related to the morphology of Cassia

(a) Valvate aestivation, Actinomorphic, corymb
(b) Imbricate aestivation, zygomorphic, corymb
(c) Imbricate aestivation, zygomorphic, umbel
(d) Valvate aestivation, zygomorphic, umbel

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : If the margins of sepals or petals overlap one another but not in any particular direction as in Cassia, the aestivation is called imbricate. It is zygomorphic flower. It can be divided into two similar halves only in one particular vertical plane. Corymb is a simple racemose inflorescence, found in Cassia.

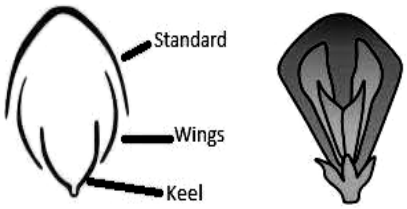
511. In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as _____. _____ and _____ respectively.

(a) Keel, Standard and Carina
(b) Standard, Wings and Keel
(c) Keel, Wings and Standard
(d) Vexillum, Keel and Standard

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Aestivation is the arrangement of either the sepals or petals in a flower bud with relation to one another.

- Vexillary is the typical aestivation of the papillionaceae corolla. The posterior vexillum (standard) overlaps the two alae (wing) which again overlap the paired anterior carina (keel).



- In this aestivation, the petal i.e. standard overlaps the two smaller lateral petals that are wings which in turn overlap. The two smallest anterior petals are keel.

512. In Calotropis, aestivation is :

(a) Imbricate (b) Twisted
(c) Valvate (d) Vexillary

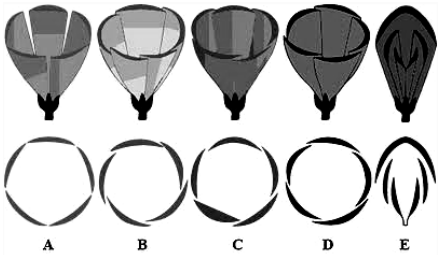
RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : Arrangement of sepals or petals in floral buds called aestivation.

- In velvet floral leaves in a whorl may just touch one another at the margins without overlapping. Ex Calotropis (Asclepiadaceae).
- When overlapping is regular in one direction so that one margin overlaps the next member on one side while the other margin is overlapped by that one before.

Ex- Cotton, (Malvaceae family)

- Imbricate aestivation, the margins of the flower overlap but not in a specific way. Ex- Cassia (Caesalpinaceae).
- In vexillary aestivation is a distinctive arrangement in which one gaint petal covers the other smaller petals. Ex- pea (Leguminaceae).



Different types of aestivation of calyx and corolla
A,Valvate, B, Twisted, C, Imbricate, D. Quincuncial, E, Vexillary

513. Identify the type of aestivation in which at least one petal completely overlaps others in a flower

A) Valvate **B) Twisted**
C) Imbricate **D) Vexillary**

The correct answer is:

(a) A, B only (b) B, C only
(c) A, D only (d) C, D only

TS EAMCET-31.07.2022 Shift-I

Ans. (d) : Vexillary aestivation occurs when the largest petal overlaps the two lateral petals, which overlap the two smallest anterior petals. eg.- Bean flower.

- In imbricate aestivation the margins of sepals or petals overlap without a clear direction. There is an irregular overlapping of petals by each other.

Ex- Cassia and Gulmohar.

514. Match List - I with List - II:

List-I	List-II
A. Imbricate	**i. Calotropis**
B. Valvate	**ii. Cassia**
C. Vexillary	**iii. Cotton**
D. Twisted	**iv. Bean**

Choose the correct answer from the options given below:

(a) (A) - (ii), (B) - (i), (C) - (iii), (D) - (iv)
(b) (A) - (ii), (B) - (i), (C) - (iv), (D) - (iii)
(c) (A) - (ii), (B) - (iv), (C) - (iii), (D) - (i)
(d) (A) - (i), (B) - (iii), (C) - (iv), (D) - (ii)

NEET (Re-Exam)-04.09.2022

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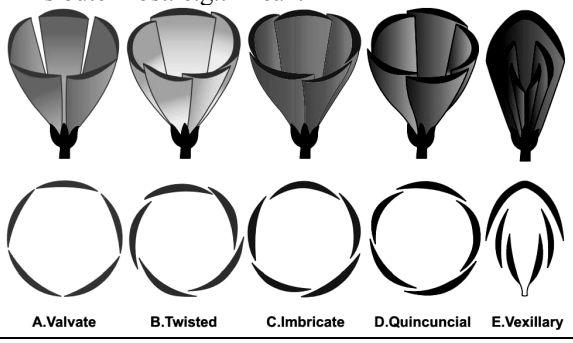
Ans. (b) : Order of inflorescence valvate, twisted, imbricate and vexillary are types of aestivation are present.

(A) Valvate aestivation:- In this sepals or petals or tepals just touch one another without any overlapping e.g.:- *Calotropis procera*.

(B) Twisted aestivation:- Here, one margin of each petal overlap the margin of an adjacent petal and the other margin being overlapped by margin of another adjacent petal.
e.g.:- Cotton, China Rose.

(C) Imbricate aestivation:- If the margin of sepals or petals overlap one another but not in any particular direction as in Cassia and Gulmohar, the aestivation is called imbricate.

(D) Vexillary aestivation:- It is the characteristics aestivation of corolla of pea when posterior petal is outermost. e.g.:- Bean.



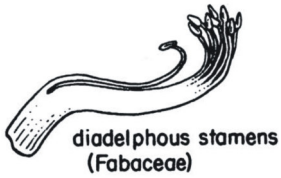
515. Which one of the following plants shows vexillary aestivation and diadelphous stamens?
(a) *Solanum nigrum*
(b) *Colchicum autumnale*
(c) *Pisum sativum*
(d) *Allium cepa*

NEET-2022

Ans. (c) : In family Fabaceae, pea (*Pisum sativum)* plant has bilateral symmetry, vexillary aestivation, diadelphous stamens, marginal placentation.

• Vexillary or descending imbricate aestivation is the arrangement of corolla in which the anterior petal is innermost and the posterior petal is outermost and largest.

Diadelphous - When the filaments are united in two bundles but the anther remain free



Marginal placentation is found in unilocular ovary the placenta forms a ridge along the ventral suture of the ovary and the ovules are borne in this ridge.

516. Smilax possesses the following characters.
(i) Six tepals and six stamens in two whorls, odd tepal of outer whorl is anterior in position and odd tepal of inner whorl is posterior in position, valvate aestivation.
(ii) Pentacarpellary, ovary inferior, pentalocular with few ovules, stigma bifid and simple.
(iii) Fruit is usually capsule, endospermous seed
(iv) Flower is solitary bisexual.
(a) i, ii, iv & iii (b) i & iii
(c) ii & iv (d) ii & iii

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Smilax flower description:- Individual umbels are about $1\frac{1}{2}$-3" across consisting of 20-120 flowers on slender pedicels, the umbels resembles a globe when fully developed. It is dioecious. The green to yellowish green staminate flowers are each 1/4" across, which consist of 6 tepals and 6 stamens with white anthers.

• Fruit in Solanceae is berry or capsule and seeds are many and endospermous.

517. Identify the correct combination
(a) Neem - absence of buds in the axil of leaflets - Pinnately compound leaf
(b) Sunflower - Opposite phyllotaxy - Inferior ovary
(c) Carrot- flowers brought to same height due to varied lengths of pedicels - involucres of bracts
(d) Pistia - Discoid stem- Lateral branch with many internodes

TS EAMCET-2015

Ans. (d) : Pistia is an aquatic plant which has discoid stem and lateral branches with many internodes.

Each node has a rosette of leaves and tufts of roots.

• Neem has pinnately compound leaves but the buds are not absent.

• Sunflower has alternate phyllotaxy and inferior ovary.

• When all the flowers arise from the single point of peduncle then it is called umbel inflorescence. Carrot has involucres of bracts at the base of whole inflorescence.

518. Verticillaster inflorescence is the characterstic feature of family :
(a) Euphorbiaceae (b) Moraceae
(c) Musaceae (d) Lamiaceae

Uttarakhand PMT-2006

Ans. (d) : Verticillaster inflorescence is an inflorescence in which the flowers are arranged in a seeming whorl, consisting infact of a pair of opposite axillary, usually sessile cymes as in many mints. In this type of inflorescence, the leaves are arranged in an opposite manner on the stem. It is common among the lamiaceae family.

Ex- Salvia and Ocimum.

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• The euphorbiaceae are distinctive in having unisexual flowers with a superior, usually 3-carpellate ovary with 1 ovule per carpel, apical axile placentation.

• Moraceae have milky or sometimes watery latex. Leaves are mostly alternate, simple, entire and pinnately veined.

• Musaceae is the family of monocot perennial herbs and widely distributed in tropical region. It is also called as the banana family, flowers are unisexual or bisexual.

519. Which of the following statements are correct ?

(A) When a fruit develops from the inflorescence, it is composite

(B) Mesocarp is the edible part in apple

(C) Gynobasic style is seen in Ocimum

(D) Hypanthodium is a special type of inflorescence found in Euphorbia species

(a) A and D are correct

(b) A and C are correct

(c) B, C and D are correct

(d) B and D are correct

Kerala PMT-2009

Ans. (b) : When a fruit develops from the inflorescence it called composite fruit. **Ex:-** Pineapple.

Gynobasic style:- When the style originates from the mid basal part of the ovary. The style arises from a central depressed part or cavity of the ovary. It is seen in Salvia, Ocimum. Gynobasic is the feature of Labiatae family or Mint family.

• In apple edible part is pseudocarp which is also known as fleshy thalamus.

• Hypanthodium is a special type of cymose inflorescence. Inflorescence in Euphorbiaceae is of cyathium type.

520. In which of the following plants, pollen is released before the stigma becomes receptive in the same flower?

(a) Solanum (b) Allium

(c) Colchicum (d) Datura

AP EAMCET-2014

Ans. (b) : Protandry- It is a condition where stamens are mature earlier than pistils as a result, pollen is released before the stigma becomes receptive in the same flower. For eg. Allium.

• **Solanum** is a large and diverse genus of flowering plants, which include three food crops of high economic imporatance: the potato, tomato and egg plant.

• **Cochicum** is a genus of perennial flowering plants which grow from bulb like corm.

• **Datura** is a genus of nine species of highly poisonous plant that belongs to the nightshade family.

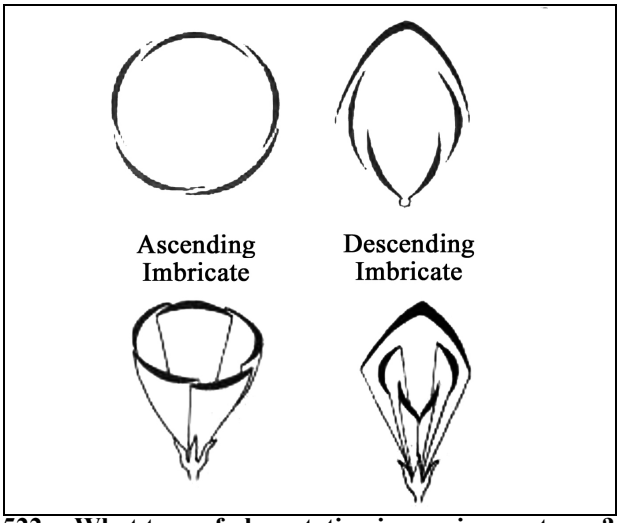
521. When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as:

(a) Vexillary (b) Imbricate

(c) Twisted (d) Valvate

AIPMT-2014

Ans. (b) : When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as Imbricate. If the margins of the sepals or petals overlap each other without any specific direction- Ex. Cassia.



522. What type of placentation is seen in sweet pea ?

(a) Basal

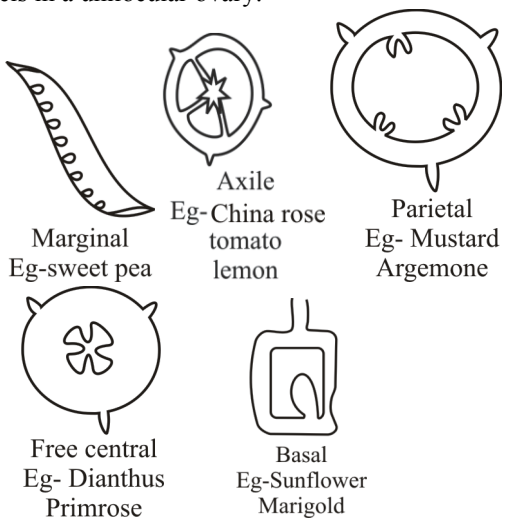
(b) Axile

(c) Free central

(d) Marginal

Haryana PMT-2006
AIPMT-2006

Ans. (d) : Placentation:- The arrangement of ovules within the ovary is known as placentation. In *Pisum sativum* (sweet pea), the placentation is marginal, in which the placenta develops along the junction of two carpels in a unilocular ovary.



523. Which one of the following organisms is correctly matched with its three characteristics

(a) Onion : Bulb, Imbricate aestivation, Axile placentation

(b) Maize : C_3 pathway, Closed vascular bundles, Scutellum

(c) Pea : C_3 pathway, Endospermic seed, Vexillary aestivation

(d) Tomato : Twisted aestivation, Axile placentation, Berry

AIPMT (Mains)-2012
AIIMS-2015

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Ans. (a) : Onion possess bulb (reduced stem), with imbricate aestivation, axile placentataion and possess perianth.

- Tomato belongs to Solanaceae family having valvate aestivation, axile placentation and berry fruit.
- Pea (Family Fabaceae) has vexillary aestivation, C_3 pathway, ex-albuminous seeds.
- Maize (monocot) has C_4 pathway and closed vascular bundle.

524. When the sepals or petals meet by their edges without overlaping the aestivation is :

(a) lmbricate (b) valvate
(c) twisted (d) axillary

HP CET-2013
VMMC-2003
Haryana PMT-2001

Ans. (b) : When the sepals or petals meet by their edge without overlapping the aestivation is valvate.

• Opening by valves; as certain capsules and anthers, meeting without overlapping, as the parts of certain buds.

Ex- Sepals of Hibiscus, petals of Calotropis and Brassica.

525. Which of these is an example for zygomorphic flower with imbricate aestivation?

(a) Calotropis (b) Mustard
(c) Canna (d) Cassia

BCECE-2012

Ans. (d) : Cassia have zygomorphic flower with imbricate aestivation while in mustard, actinomorphic flower occurs. Cassia belongs to family Fabaceae. Because of the irregularity the corolla also has petal that differ from each other in sizes. Ascending imbricate aestivation is found in Cassia and Gulmohur flower that can be divided into two halves from one plane is known as a zygomorphic flower.

526. Type of aestivation shown by Pisum is

(a) Imbricate (b) Vexillary
(c) Twisted (d) Quincuncial

AIPMT (Screening)-2012
J&K CET-2011

Ans. (b) : Vexillary aestivation occurs in family Fabaceae. When the largest petal overlaps the two lateral petals; which overlap the two smallest anterior petals. The vexillum is the bigger petal, while the wings are the two bent petals that are laterally positioned. The two innermost boat shaped petals are known as keel in this location.

Ex- Bean flower.

527. In Dianthus, placentation is

(a) basal (b) free central
(c) axile (d) marginal

AP EAMCET-1999
JIPMER-2011

Ans. (b) : The arrangement of ovules within the ovary is called placentation.

Ovary is one chambered and the placenta bearing the ovules develops all around the central axis.

528. The flower of Calotropis has which of the following aestivations?

(a) Twisted (b) Imbricate
(c) Valvate (d) Vexillary

J&K CET-2012

Ans. (c) : The arrangement of sepals or petals in flower is called the aestivation. In Calotropis, valvate aestivation is seen in which the sepals or petals do not overlap. In twisted aestivation, regular overlapping occurs, for example China rose. In imbricate aestivation there is the irregular type of overlapping for example Cassia.

529. In which of the following aestivation petals one margin covers the other and the margin of next petal is covered by its previous one?

(a) Valvate (b) Twisted
(c) Imbricate (d) Quincuncial

J&K CET-2006

Ans. (b) : Twisted aestivation : One margin of each petal overlap with the margin of next petal e.g. - Hibiscus, cotton and lady -finger.

Valvate aestivation : Sepals or petals are in a whorl, just touch one another, they do not overlap one another. Example - Calotropis.

Imbricate aestivation : When margins of sepals or petals overlap without a clear direction.

Quincuncial aestivation : It is aestivation of 5 petals where the margin of 2 petals are exterior, two interior and the fifth is having one margin exterior or interior.

530. A perennial shrub has compound leaves and solitary zygomorphic and epigynous flowers. Each flower reveals dichlamydeous condition with many stamens and multiple fruit with exalbuminous seeds. What is the ratio of advanced and primitive characters in it?

(a) 1:2 (b) 2:3
(c) 1:1 (d) 3:2

Manipal-2009

Ans. (c) : The compound leaves, solitary flower, many stamens and exalbuminous condition are primitive nature and zygomorphic , epigynous flowers, dichlamydeous condition with multiple fruit formation is advanced characters.

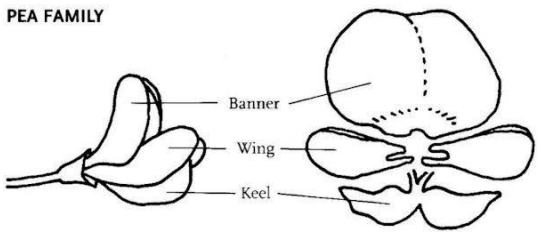
Therefore, the ratio of advanced and primitive characters in the question is 1:1.

531. Keel is characteristic of the flowers of:

(a) Gulmohur (b) Cassia
(c) Calotropis (d) Bean

AIPMT (Screening)-2010

Ans. (d) : Keel is the characteristic feature of vexillary aestivation found in family Fabaceae and Papilionaceae (Ex-Bean, Pea, Indigofera.)



Imbricate aestivation is seen in Cassia and Gulmohar and valvate aestivation is seen in the Calotropis plant .

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532. Aestivation of petals in the flower of cotton is correctly shown is

(a)
(b)
(c)
(d)

AIPMT (Mains)-2010

Ans. (a) : Aestivation is the arrangement of sepals and petals in floral buds.

• Cotton plant shows the twisted aestivation in which one margin of petal overlaps regularly the margin of the adjacent petal and so on.

Valvate :- The sepals and petals whorls just touch each other at the margin but do not overlap. Ex- Calotropis.

Imbricate – One sepals or petals are totally internal and one are totally external and other are twisted like.

e.g.- Gulmohar, Cassia and Legumes

Quincuncial - 2 sepals or petals are totaly internal and 2 are totally external and other are twisted like.

Ex- Cassia and Delonix.

533. Consider the following four statements 1, 2, 3 and 4. Select the right option for two correct statements.

Statements :

(1) In vexillary aestivation, the large posterior petal is called-standard, two lateral ones are wings and two small anteior petals are termed keel

(2) The floral formula for Liliaceae is

$$Br \oplus ⚥ \overset{\frown}{P_{(3+3)} A_{3+3}} \underline{G}_{(3)}$$

(3) In pea flower the stamens are monadelphous

(4) The floral formula for Solanaceae is

$$\oplus ⚥ K_{(3)} C_{(3)} A_{(4)} \underline{G}_{(3)}$$

The Correct statements are

(a) (3) and (4) (b) (1) and (3)
(c) (1) and (2) (d) (2) and (3)

AIPMT (Mains)-2010

Ans. (c) : Vexillary aestivation has papilionaceous corolla which has a large posterior petal called-**standard**, two lateral ones called wings and two small anterior petals termed as keel.

• Liliaceae floral formula is :- $Br \oplus ⚥ \overset{\frown}{P_{(3+3)} A_{3+3}} \underline{G}_{(3)}$

• **Diadelphous** stamens have filaments united forming two bundles and anthers are free **e.g-gram, pea, bean**.

• In **monoadelphous** stamens, the filaments of all stamens are united forming a single bundle but the anthers are free, **e.g.-Cotton, lady's finger**.

• Solanaceae, floral formula is :-

$$Ebr \oplus ⚥ K_{(5)} \overset{\frown}{C_{(5)} A_5} \underline{G}_{(2)}$$

534. Bicarpellary gynoecium and oblique ovary occurs in : -

(a) Mustard (b) Banana
(c) Pisum (d) Brinjal

AIPMT-2001

Ans. (d) : Floral formula of Solanaceae family-

Formula $Ebr \oplus ⚥ K(5)\overset{\frown}{C(5) A5} \underline{G}(2)$

• Brinjal or *Solanum melongena* belongs to family Solanaceae. The fruits are rich in iodine. They are used in the form of vegetable.

• Gynoecium is bicarpellary, syncarpous, forming a superior bilocular ovary. Each locule has many ovule on axile placentation so members of Solanaceae are characterised by the presence of an obliquely placed septum in the ovary and highly swollen placenta.

• The oblique septum is probably due to shifting in the position of the ovary.

535. Tetradynamous conditions occur in : -

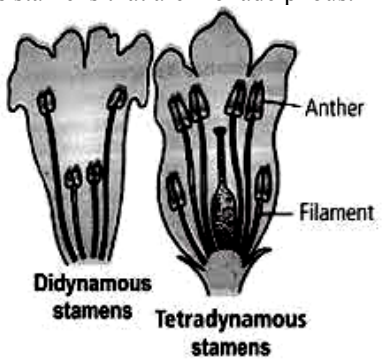
(a) Cruciferae (b) Malvaceae
(c) Solanaceae (d) Liliaceae

AIPMT-2001

Ans. (a) : Tetradynamous condition is found within the **family of Brassicaceae or Cruciferae**.

• In tetradynamous condition there are six stamens, 4 are long and 2 are short i.e. 4+2 arrangement of stamens. It is a characteristic feature of Cruciferae members. In Liliaceae 6 stamens are arranged in whorls of 3 each (3+3).

• In Solanaceae there are 5 stamens, they are epipetalous and polyandrous. In Malvaceae there are numerous stamens that are monadelphous.



536. The correct floral formula of chilli is :

(a) $\oplus ⚥ K_5 \overset{\frown}{C_5 A_{(5)}} \underline{G}_2$ (b) $\oplus ⚥ K_{(5)} C_5 A_5 \underline{G}_{(2)}$

(c) $\oplus ⚥ K_{(5)} \overset{\frown}{C_{(5)} A_5} \underline{G}_{(2)}$ (d) $\oplus ⚥ K_5 C_{(5)} A_{(5)} \underline{G}_{(2)}$

AIPMT (Screening)-2011

Ans. (c) : Chilli belongs to the family Solanaceae

$$\oplus ⚥ K_{(5)} \overset{\frown}{C_{(5)} A_5} \underline{G}_{(2)}$$

• Flowers are bisexual actinomorphic ⊕; Calyx-5 & Gamosepalous, Corolla – 5 & Gamopetalous, Androecium – 5, free epipetalous basifixed, inferior ovary gynoecium, bicarpellary, syncarpous and ovary superior.

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537. In a flower there are five unequal petals. The posterior petal is the largest. The two anterior petals are partially fused to form a boat shaped structure. The two lateral petals are smaller than the posterior petal. Which one of the following characters is not associated with such a flower?

(a) The aestivation of the petals is descending imbricate
(b) The odd sepal is anterior
(c) The pollination is by piston mechanism
(d) The number of carpels is many

AP EAMCET-2005

Ans. (d) : The given description is the characteristic feature of corolla of the family Papilionaceae.

The flowers belonging to the Papilionaceae family has vexillary type of aestivation in which, there is one large posteriorly placed petal called **vexillum** that overlaps the lateral petal called **wings**.

• These wings overlap the anterior petals that are fused to form a boat like structure called **keel or carina**.

• This type of aestivation is also called **descending imbricate**. These flowers also have an odd anterior sepal.

• They show piston mechanism of pollination. Their gynoecium has one carpel, it is monocarpellary, superior, unilocular with marginal placentation. For **example– Pea, Dalbergia etc.**

J. Fruit

538. Pome fruit is found in

(a) mango (b) apple
(c) litchi (d) peach

AIIMS-27.05.2018 Shift-I
Karnataka CET-2013
Manipal-2012
J&K CET-2012
UP CPMT-2011
Punjab MET - 2008
MGIMS Wardha-2007

Ans. (b): Apple is a type of pome fruit in which receptacle is simple fleshy but it is false fruit as it is surrounded by a fleshy thalamus which is edible. The fleshy thalamus is the edible part of apple.

Peach is a drupe type fruit. The fleshy part of the fruit called **mesocarp** is the edible part.

539. In which of the following fruits, the edible part is the aril?

(a) Apple (b) Pomegranate
(c) Orange (d) Litchi

Manipal-2012
CG PMT-2011
CMC Ludhiana-2009
JCECE-2009,2013
AI PMT-2006
Uttrakhand -2005
JIPMER-1997
AFMC-2008

Ans. (d) : Aril is the edible part in the fruit of litchi. The aril is an accessory seed covering often formed from an outgrowth at the base of the ovule.

Fleshy thalamus is the edible part of apple (*Pyrus malus*), juicy testa is the edible part of pomegranate (*Punica granatum*) and endocarpic and mesocarpic juicy hairs are edible part of orange (citrus sp.).

540. Drupes are called stony fruits because they have hard

(a) epicarp and mesocarp (b) mesocarp
(c) epicarp (d) endocarp

JCECE-2012
AMU-2005
Manipal-2004
Uttrakhand PMT-2004

Ans. (d) : Drupes: Drupes are called as hard stony fruits because of the hard endocarp. These fruit usually develop from a single carpel and mostly from flowers with superior ovaries.

Drupes have parts-

Endocarp: Its the hard shell that surrounds the endosperm and is not edible.

Mesocarp: The mesocarp is a fibrous husk and is not edible.

Endosperm: It has seed inside.

For example mango, coconut, plum, raspberry.

541. Lomentum is a kind of:

(a) inflorescence (b) plant
(c) fruit (d) insect

Uttarakhand PMT-2007
Uttarakhand-2005
JCECE-2005
Manipal-2000,2002
Punjab MET-2004

Ans. (c) : Lomentum is a term used to describe a kind of dry, schizocarpic fruit developed from legume or pod which is constricted and partitioned between the seed into a number of one seeded chamber. Ex- Acacia which develops from monocarpellary, superior ovary with marginal placentation.

542. Match the following:

List-I		List-II		List-III	
A)	One seeded bits of fruits	I)	Composite	i)	Pome
B)	Jack fruit	II)	Mericarps	ii)	Rice
C)	Fleshy thalamus	III)	Caryopsis	iii)	Entire inflorescence
D)	Fused pericap & seed coat	IV)	Apple	iv)	Schizocarpic

A B C D
(a) I iv, II iii, III ii, IV i
(b) I iv, III i, IV iii, II ii
(c) II iv, I iii, IV i, III ii
(d) I iv, II iii, III i, IV ii

AP EAPCET-23.05.2023, Shift-II

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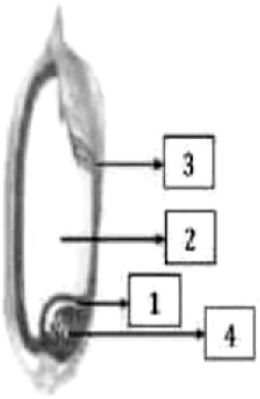
Ans. (c) : When schizocarpic fruits mature, they split into single-seeded parts known as mericarps.
The fruit that emerge from the entire inflorescence are known as composite fruit. Jack fruit is a composite or multiple fruit derived from whole of spadix inflorescence.
In few species such as apple, the thalamus also contributes to fruit formation such fruits are called false fruit. Apple is a pome, it is surrounded by fleshy thalamus.
When the pericarp is fused with the thin seed coat is called caryopsis. It is common in rice.

543. Identify the parts labeled 1,2,3,4 in the figure Caryopsis of Oryza?



(a) 1. endosperm, 2. scutellum, 3. embryo, 4. pericarp
(b) 1. pericarp, 2. embryo, 3. scutellum, 4. endosperm
(c) 1. scutellum, 2. endosperm, 3. pericarp, 4. embryo
(d) 1. embryo, 2. pericarp, 3. endosperm, 4. scutellum

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : 1. Scutellum- The shield-shaped cotyledon of a monocotyledon (such as a grass).
2. Endosperm- The endosperm is a tissue produced inside the seeds of most of the flowering plants following double fertilization.
3. Pericarp- The pericarp of fruit develops from ovary wall. It is a type of fruit coat.
4. Embryo-The embryo is formed after the process of syngamy takes place in plants.

544. Caryopsis is present in

(a) wheat (b) ground nut
(c) coconut (d) mango

AP EAMCET-25.09.2020 Shift-I
JIPMER-2018

Ans. (a) : A caryopsis is present is grasses (Poaceae) family. For Ex- Wheat, Barley and Rice.
A caryopsis is a type of simple dry fruit. One that is monocarpellary (formed from a single carpel) and indehiscent (not opening at maturity) and resembles an achene, except that in a caryopsis the pericarp is fused with the thin seed coat.
• The caryopsis is popularly called a grain and is the fruit typical of the family Poaceae.

545. Identify the correct features of Mango and Coconut fruits.

(i) In both fruit is a drupe
(ii) Endocarp is edible in both
(iii) Mesocarp in Coconut is fibrous, and in Mango it is fleshy
(iv) In both, fruit develops from monocarpellary ovary

Select the correct option from below :

(a) (i) and (ii) only
(b) (i), (iii) and (iv) only
(c) (i), (ii) and (iii) only
(d) (i) and (iv) only

NEET-2020 Phase-II

Ans. (b) : The fruits of mango and coconut are drupe, with endocarp being stony and non-edible. They develop from monocarpellary ovary. In coconut mesocarp is fibrous, while in mango it is fleshy and pulpy.

546. In some plants thalamus contributes to fruit formation. Such fruits are termed as:

(a) Parthenocarpic fruit
(b) False fruits
(c) Aggregate fruits
(d) True fruits

NEET-2020 Phase-II

Ans. (b) : When the plants thalamus contributes to fruit formation known as false fruit.
Example- Apple, Pear, etc.

547. Match the types of fruits presented in List-I with the name of the plants given in the List-II

List -I		List-II	
A	**Schizocarpic fruit**	**I**	**Mustard**
B	**False fruit**	**II**	**Acacia**
C	**Parthenocarpic fruit**	**III**	**Strawberry**
D	**Dry fruit**	**IV**	**Banana**
		V	**Cotton**

The correct match is:

	A	B	C	D
(a)	IV	V	III	II
(b)	II	III	IV	I
(c)	V	IV	III	I
(d)	II	V	IV	II

TS EAMCET-08.05.2019 Shift-II

Ans. (b) :

	Types of fruit	Plant
A.	Schizocarpic fruit	Acacia
B.	False fruit	Strawberry
C.	Parthenocarpic fruit	Banana
D.	Dry fruit	Mustarad

548. Match the following:

(A) Siliqua (i) *Lycopersicum esculentum*
(B) Caryopsis (ii) *Triticum aestivum*
(C) Berry (iii) *Helianthus annuus*
(D) Cypsela (iv) *Brassica campestris*

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(a) A-ii, B-i, C-iii, D-iv
(b) A-i, B-ii, C-iii, D-iv
(c) A-iv, B-ii, C-i, D-iii
(d) A-iii, B-ii, C-i, D-iv

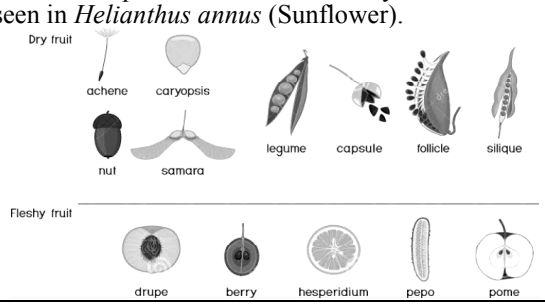
AIIMS-25.05.2019 Shift-I

Ans. (c) : Siliqua is a type of fruit which have two fused carpels. This is seen in *Brassica campestris* (Field mustard).

• **Caryopsis** is present in Poaceae family, and it is a type of fruit in which the seed coat is fused with the fruit coat. This is seen in *Triticum aestivum* (Wheat).

• **Berry** is produced from a single flower with one ovary. It is a fleshy fruit without a stone (seed). This is seen in *Lycopersicum esculentum* (Tomato) .

• **Cypsela** having a single-seeded fruit which develops from a one part of the inferior ovary. This condition is seen in *Helianthus annus* (Sunflower).



549. Which of the following group does not represent monocot?
Apricot, mango, guava, apple, coconut, strawberry
(a) Apricot, mango, guava
(b) Apple, strawberry, coconut
(c) Coconut, apple, cashewnut
(d) Coconut, strawberry, mango

AIIMS-26.05.2018 Shift-I

Ans. (a): Monocots are grass like flowering plants and the seeds of monocot contain only one cotyledon or embryonic leaf. The seeds of dicot have two embryonic cotyledon.
Ex- Wheat, Rice, Corn and Coconut plants.
• The structure of dicot is swollen type as it acts as source of food storage for the developing seeds.
Ex- Apple, Apricot, Mango, Guava and Peaches etc, having dicot structure. Thus these are not represent monocot.

550. Edible part in 'sorosis', a composite fruit, is
(a) cotyledons
(b) endosperm
(c) perianth and peduncle
(d) fleshy thalamus

Tripura JEE-2018
JIPMER-2010
BHU PMT(Screening) - 2005

Ans. (c) : The edible parts are the perianth & peduncle. The term sorosis means the fleshy type of fruit formed by the process of combination of various flowers with their particular container or repository ovaries etc. Sorosis is a composite fruit that develops from a catkin, spike and spadix.
Ex- mulberry, jack fruit and pine apple.

551. The morphological nature of the edible part of coconut is
(a) Perisperm (b) Cotyledon
(c) Endosperm (d) Pericarp

NEET-2017
Manipal-2002

Ans. (c) : The edible part of coconut is endosperm. Coconut consists of free nuclear endosperm (coconut water) and cellular endosperm (white kernel).
Endocarp: It is the hard shell that surrounds the endosperm and is not edible.
Mesocarp: The mesocarp is a fibrous husk and is not edible.

552. Coconut fruit is a
(a) Drupe (b) Berry
(c) Nut (d) Capsule

NEET-2017

Ans. (a) : Coconuts are classified as a fibrous one - seeded drupe. Drupe is a fruit with a hard stony covering enclosing the seed (like a peach or olive) and comes from the word drupa meaning overripe olive.
• A drupe develops from monocarpellary superior ovary and are one seeded.

553. In *Pyrus malus*, the false fruit is formed from:
(a) thalamus (b) pedicel
(c) peduncle (d) calyx

AP EAMCET-2001

Ans. (a) : In apple (*Pyrus malus*) the edible part of the fruit consists of fleshy thalamus, this make apple a false or accessory fruit.
When the develops from the parts of the flower - like base or thalamus , the perianth or other than ovary.
Example of false fruit are apple, strawberry, mulberry, pears, pineapple etc.

554. Geocarpic fruit is : -
(a) Potato (b) Peanut
(c) Onion (d) Garlic

AIPMT-2002

Ans. (b) : Geocarpic fruit is groundnut (Peanut).
Geocarpy refers to an extremely rare means of plant reproduction. Here the plants produce via diaspores within the soil. This has evolved as an effective means of ensuring a suitable environment for the plant's offspring

555. Pepo is a fruit of
(a) Cruciferae (b) Leguminosae
(c) Cucurbitaceae (d) Liliaceae

UP CPMT-2013

Ans. (c) : Pepo is a fruit of the Cucurbitaceae family. A fleshy, several- seeded fruit that has developed from one flower having a single ovary divided into several carpels, which develops a firm or rough rind as it matures.

556. Which of the following promotes softening of fruits?
(a) Polygalacturonase (b) Colchicine
(c) Polyethylene glycol (d) Cellulase
(e) Brazzein

BCECE-2015
Kerala PMT-2008

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Ans. (a) : Polygalacturonase (PG) is the major enzyme responsible for pectin disassembly in ripening fruit. PG_s are promotes softening of fruits. PG_s becomes abundant during ripening and has a role in cell wall degradation. PG_s is also called as pectinase.

- Colchicine is a historic treatment for gout.
- Polyethylene glycol is an efficient method of transforming plant cells by direct gene transfer.
- Brazzein is used as a sweetener.

557. Berries drupes and pomes are:

(a) simple dry fruits
(b) simple succulent fruits
(c) aggregate fruits
(d) composite fruits

J&K CET-2002

Ans. (b) : Generally berries, drupes and pomes are simple succulent fruits. The fruits arising from the single ovary of a single flower. As they have fleshy juices, they make the succulent fruits.

558. Jackfruit is derived from which of the following?

(a) An inflorescence
(b) All carpels in a flower
(c) One ovary of single flower
(d) Thalamus

Assam CEE-2014

Ans. (a) : Jackfruit is derived from an inflorescence. It is a type of racemose infloresence male and female flowers consist of a single stamen or ovary. Jack fruit is a composite or multiple fruit derived from whole of spadix inflorescence.

559. Pineapple (ananas) fruit develops from

(a) a unilocular polycarpellary flower
(b) a multipistillate syncarpous flower
(c) a cluster of compactly borne flowers on a common axis
(d) a multilocular monocarpellary flower

BHU PMT (Mains)-2010
AIPMT-2006

Ans. (c) : The pine apple fruit is a sorosis i.e type of multiple fruits. The whole inflorescence turns into a compact fruit. In pineapple is fleshy axis, bracts, fused perianth and pericarp are edible.
Pineapple fruit develops from a cluster of compactly borne flowers on a common axis. It develops from spike, spadix or catkin. In such cases, the flower remain with their succulent petals, the axis bearing them grows and become fleshy or woody.

560. Which of the following is a true nuts ?

(a) Walnut (b) Cashew nut
(c) Ground nut (d) Pistachio

JIPMER-2010

Ans. (b) : The nut is the single-seeded fruit. An example of a true nut is cashew nut, Hazelnuts are also a example of true nuts. It is rich source of vitamin C and sugar. The cashew fruit is a kidney shaped drupaceous nut, greenish grey.

- Groundnut is the lomentum type of fruit.
- Coconut is the drupe fruit.
- Walnut is the drupe fruit.

561. A fleshy-fruit with leathery exocarp is called

(a) drupe (b) berry
(c) pome (d) hesperidium

JCECE-2010

Ans. (d) : A fleshy fruit with leathery exocarp is called hesperidium. It is many chambered and many seeded fleshy fruit developed from multicarpellary, syncarpous and superior ovary. Hesperidium fruits, which include most citrus fruit, have leathery rind embedded with glands producing volatile compounds.
The epicarp is leathery and glandular, mesocarp is thin and smooth. Ex- lemon and orange.

562. If a fruit is developed from bicarpellary syncarpus inferior ovary with basal placentation and with a single ovule, the fruit is termed as

(a) siliqua (b) cypsela
(c) silicula (d) lomentun.

AMU-1995

Ans. (b) : Cypsela have possessing basal placentaion, and it is a dry indehiscent single seeded fruits that develop from inferior ovary of a syncarpous bicarpellary gynoecium. It belongs to Asteraceae family. Cypsela is a type of achenial fruits. They are sometimes included with achenes.
Ex- Sunflower.

563. An aggregate fruit is one which develops from:

(a) Multicarpellary syncarpous gynoecium
(b) Multicarpellary apocarpus gynoecium
(c) Complete inflorescence
(d) Multicarpellary superior ovary

AIPMT-2014

Ans. (b) : An aggregate fruit is one which develops from multicarpellary apocarpous gynoecium.
Aggregate fruit usually develops from single flower that had multiple ovaries which were split.

- Fusion of ovaries results in the formation of aggregate fruit. Ex- Strawberry, Raspberry etc.

564. Placenta and pericarp are both edible portions in:

(a) Apple (b) Banana
(c) Tomato (d) Potato

AIPMT-2014

Ans. (c) : Placenta and pericarp are both edible portions in Tomato. Tomato is the example of berry fruit. The placenta can be defined as an outgrowth of a parenchymatous tissue in the inner wall of the ovary to which ovules are remains attached.

- In Banana edible part is endocarp and less developed mesocarp.
- In Apple edible part is thalamus (Pseudocarp).
- In Potato edible part is tuber. It is thickened underground part of a stem.

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565. Juicy hair-like structures observed in the lemon fruit develop from: -

(a) Exocarp
(b) Mesocarp
(c) Endocarp
(d) Mesocarp and endocarp

Rajasthan PMT - 2007
AIPMT-2003

Ans. (c): The juicy hair-like structures observed in the lemon fruit develop from endocarp, which is the layer inside of the pericarp. It surrounds the seed.
In citrus fruits, the endocarp is separated into sections, called as segments, which contain the juice of the fruit.

566. Composite fruit develops from

(a) Single ovary (b) Inflorescence
(c) Apocarpous ovary (d) Pericarp

AIIMS-2007

Ans. (b) : Composite fruits are multiple fruits which are developed from the complete inflorescence. Aggregate fruit is developed from a single flower with the multicarpellary apocarpous superior ovary and are also called as inflorescence.
They are of two types - Sorosis and Syconus.

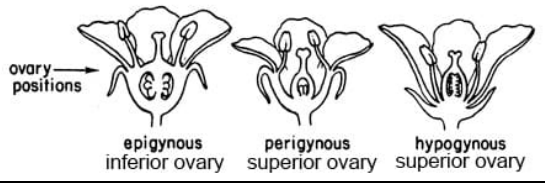
- Spike, spadix and catkin type of inflorescence gives rise to sorosis type of fruit. Ex-Ananas, Artocarpus.
- Syconus type of fruits develop from a hypanthodium inflorescence. Ex- Ficus

567. Plants with inferior ovary usually bear

(a) pseudocarps (b) berries
(c) aggregate fruits (d) seedless fruits

AIIMS-2012

Ans. (a) : The plants having inferior ovaries often lead to involvement of other structure like the thalamus in the formation of the fruits. Thus they are called **pseudocarps**.



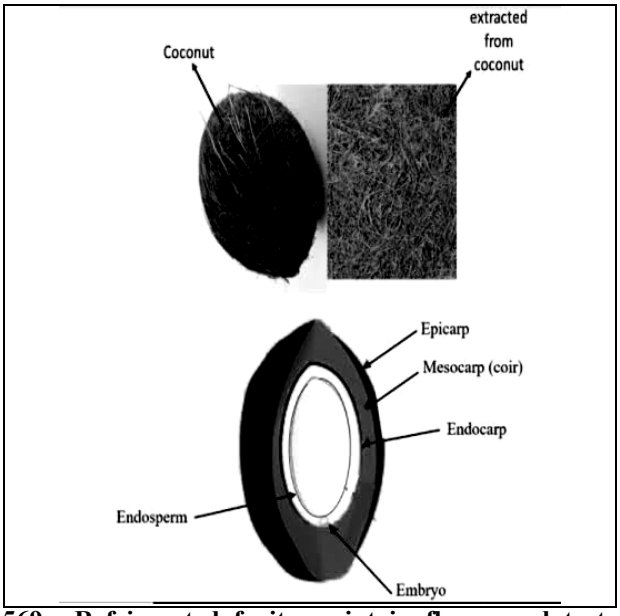
568. Coconut's husk fibre coir of commerce is extracted from

(a) Epicarp (b) Mesocarp
(c) Endocarp (d) Seed coat

AIIMS-2001

Ans. (b) : Mesocarp: The mesocarp is a fibrous husk and it is not edible.

• Coir is the fibrous material found between the hard, internal shell and the outer coat of a coconut. This part is called mesocarp.
Commercial coir is obtained from the fibrous husk (Mesocarp) of fruits of coconut palm. The fibre is valued for its lightness elasticity and exceedingly high resistance to mechanical wear and dampness.



569. Refrigerated fruits maintain flavor and taste for longer period due to:

(a) Non-availability of O_2
(b) Presence of excess of CO_2
(c) Presence of excess humidity
(d) Slower rate of respiration

AIIMS-2015

Ans. (d) : In lower temperature, the respiration rate of fruits is minimized. The respiration method is nothing over an common chemical change. Refrigerated fruits maintain flavor and test for longer time period **due to the slower rate of respirations.**

570. The small projections present on the surface of pineapple fruit represent:

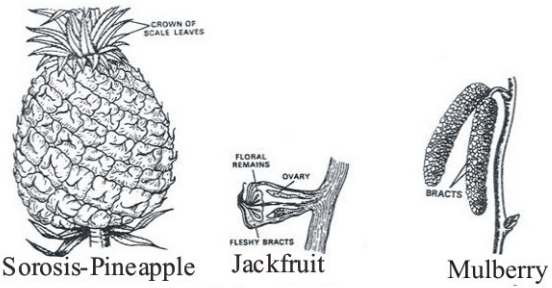
(a) Persistent styles (b) Persistent stamens
(c) Persistent calyx (d) Persistent bracts

AIIMS-2015

Ans. (d) : When the small projections on the surface of pineapple fruit represent the condition is called persistent bracts.
Bracts are specialized plant structures that serve varied functions such as attracting pollinators and protecting inflorescence (flower structures).

■ Pineapple is a **sorosis fruit**.

Example-Mulberry, Jackfruit, Pineapple. It is a multiple fruit developed from a spike, catkin, spadix inflorescence. The edible part of which are the perianth and peduncle.



Composite fruits

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571. Fruit of Mangifera indica is
(a) berry (b) drupe
(c) capsule (d) siliqua
AIPMT-1991

Ans. (b) : Scientific name of Mango is Mangifera indica.
Mango and coconut is Drupe. Endocarp is strong and hard. Mesocarp is fleshy and epicarp is membranous.

572. Mango juice is obtained from
(a) epicarp
(b) mesocarp
(c) endocarp
(d) pericarp and thalamus
AIPMT-1989

Ans. (b) : Mango belongs to the cashew family Anacardiaceae. In mango (a drupe) edible part is mesocarp which is fibrous, pulpy and juicy.

573. Fruit of groundnut is
(a) legume (b) caryopsis
(c) berry (d) nut
AIPMT-1988

Ans. (a) : Groundnut is a legume crop grown mainly for its edible seeds.
Groundnut belongs to the family fabaceae.

574. Which one of the following belong to the same category?
(a) Coconut, almond and mango
(b) Beetle nut, chestnut and coconut
(c) Tomato, orange and coconut
(d) Chestnut, coconut and cashew nut
BVP-2014

Ans. (a) : Coconut, Mango and Almond are drupes. They come under the category of succulent fleshy fruits.

575. Fig is a:
(a) Sorosis (b) Syconus
(c) Drupe (d) Berry
BCECE-2015

Ans. (b) : The inflorescence of Fig is known as syconium. This is formed by an enlarged, fleshy, hollow receptacle with multiple ovaries on the inside surface. After pollination the floret develops into achenes or drupes, which encloses seeds.

576. The fruit development from the single ovary is said to be:
(a) composite type (b) simple type
(c) aggregate type (d) none of these
J&K CET-2005

Ans. (b) : The fruit development from the single ovary is said to be a simple ovary type fruit. It develops from a single ovary of a single flower.
Composite fruit: develop from an inflorescence. **Aggregate fruit:** develop from multicarpellary apocarpous ovary.

577. Which is correct pair for edible part : -
(a) Tomato – Thalamus
(b) Maize – Cotyledons
(c) Guava – Mesocarp
(d) Date palm - Pericarp
AIPMT-2001

Ans. (d) : The edible part of date palm is fleshy pericarp. Each fruit of date palm is single seeded long berry.
- Tomato-mesocarp,
- maize-endosperm,
- guava-thalamus and pericarp.

578. Which of the following taxons is known for the absence of fruits?
(a) Polypetalae (b) Gamopetalae
(c) Gymnospermae (d) Monochlamydae
AP EAMCET-2001

Ans. (c) : Gymnosperm form the link between pteridophytes and angiosperm, more advanced than pteriodphytes and more ancient group than angiosperm. Gymnosperm originated in the late Paleozoic era.

579. How many plants in the list below have composite fruits that develop from an inflorescence? Walnut, poppy, radish, fig, pineapple, apple, tomato, mulberry
(a) 4 (b) 5
(c) 2 (d) 3
Manipal-2015

Ans. (d) : Composite fruit develop from the whole infloresence and mulberry, fig and pineapple are the composite fruits. The composite fruit is also called the infructesence. The simple fruits develops from single flower. Walnut is a simple fruit that has hard and woody epicarp and is called nut.
Poppy is a simple fruit that is called capsule.
Radish is a root that performs storage function.
Apple is a simple false fruit called pome.
Tomato is simple fruit that has fleshy pericarp and is called fleshy fruit.

580. What is the fruit that develops from a tricarpellary, syncarpous, inferior ovary with parietal placentation?
(a) Pepo (b) Pome
(c) Cypsela (d) Capsule
AP EAMCET-2004

Ans. (a) : The pepo is a kind of fleshy indehiscent fruit which is present is cucurbita. It develops from a tricarpellary, syncarpous, inferior ovary with parietal placentation. Pome is a false fruit as like apple which has an axile placentation. Cypsela is a small single seeded dry fruit and it develops from the bicarpellary syncarpous inferior ovary.

581. A fruit, developing from an inflorescence is called
(a) etaerio (b) composite fruit
(c) achene (d) berry
AMU-2002

Ans. (b) : Composite fruit is developed from an entire inflorescence. These are of two types-
(1). Sorosis- They are developed from the spike, spadix and catkin infloresence. Ex- Jackfruit, Mulberry, Pineapple.
(2). Syconus- They are developed from hypanthodium and coenanthedium inflorescence with flask shaped receptacle becoming fleshy and individual female flower producing small achene like fruitlets. Ex- Peepal, Fig, Banyan.

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• **Achene-** They are developed from monocarpellary superior or inferior ovary but pericarp and seed coat are free e.g.- *Mirabilis jalapa*, polygonum

• **Berry** is a seeded fleshy fruit developed from monocarpellary to polycarpellary (multicarpellary) may be superior or inferior ovary.

Ex- Tomato, Brinjal, Banana, Grapes, etc.

582. From which part of *Cocos nucifera*, coir is obtained :

(a) Endocarp (b) Mesocarp
(c) Epicarp (d) Any part of fruit

Punjab MET-2009
CMC Vellore-2009
MGIMS Wardha-2003

Ans. (b) : Coir is a type of natural fibre obtained from the mesocarp layer of coconut (*Cocos nucifera*). It is a versatile fibre used in manufacturing mats, ropes, mattresses, brushes, etc.

• Mesocarp is a coarse hairy and husky layer present between the hard endocarp and membranous epicarp of the coconut fruit. Coir can't be obtained from epicarp, endocarp or any parts of fruit. It is only obtained from the mesocarp.

• In coconut (drupe or stone fruit), epicarp is thin mesocarp is fibrous producing coir.

583. Kattha is obtained from the heart wood of:

(a) *Acacia arabica*
(b) *Acacia fornesiana*
(c) *Acacia auriculiformis*
(d) *Acacia catechu*

Manipal-2006

Ans. (d) : Kattha is obtained by boiling the heartwood of *Acacia catechu* which is also known as 'Khair tree'.

It serves to provide mechanical support. Heartwood is the central region of old trees, that is formed earlier during growth, with tannins, resin, and other substances imparting it the black color.

584. Seedless banana is

(a) parthenocarpic fruit (b) multiple fruit
(c) drupe fruit (d) true fruit

WB JEE-2009

Ans. (a) : Seedless banana is parthenocarpic fruit. Parthenocarpy is the formation of fruit without fertilization of ovules and therefore, the fruit is seedless. True fruits develop from the ovary while false fruits are those that develop from some other part of flower except the ovary.

585. In Datura the fruit is

(a) septicidal capsule (b) porous capsule
(c) septifragal capsule (d) loculicidal capsule

Punjab MET-1999

Ans. (a) : The fruit of datura is septicidal capsule but its dehiscence is of septifragal nature in which placenta remains attached in the center of undivided fruit and pericarp's segment becomes separated.

The condition is where, septa between the locules of the capsule split and the fruit opens to release the seeds, then this type of dehiscence is called as septicidal dehiscence. For example - Datura.

Datura plant is poisonous plant and bears fruit capsule.

586. Bicarpellary, syncarpus and with pseudoseptum fruit is:

(a) siliqua (b) akene
(c) capsule (d) all of these

Rajasthan PMT-2004

Ans. (a) : Bicarpellary, syncarpus and with pseudoseptum fruit is called siliqua. Ex- Brassica.

It is a type of dry fruit, it develops from two fused carpels with superior ovary.

Achene- They develop from monocarpellary superior or inferior ovary but pericarp and seed coat are free as - *Mirabilis jalapa*, polygonum.

Capsule- They develop from bicarpellary to multicarpellary, superior or inferior ovary. e.g. poppy, partulaca etc.

587. Maize grain is:

(a) seed (b) embryo
(c) ovule (d) fruit

AFMC-2005

Ans. (d) : Maize grains usually are called as fruits because they are yielded from ripened ovary. Maize grain is not a seed, but a single seed fruit. Its fruits wall and seed coat are fused into a single layer. The grain is monocotyledonous and endospermic There is a small tube near the top of the grain. A very slight, whitish patch on one side of grain marks the embryo.

588. If a tree flowers thrice in a year in October, January and July in Northern India, the plant is

(a) photo and thermo sensitive
(b) photo and thermo insensitive
(c) photo sensitive but thermo insensitive
(d) thermo sensitive but photo insensitive

BHU PMT (Mains)-2009

Ans. (b) : In this condition, a plant flowers thrice in a year, it is photo and thermo insensitive. Plants respond to changing season to initiate their development and flowering.

In Northern India the temperature and light periods are different in the months of October, January and July, because flowering can take place during any periods of the year, therefore, the plant is not sensitive to photoperiod and temperature.

589. Hairy styles help in the dispersal of fruits in : (1) Clematis (2) Aristolochia (3) Naravelia (4) Mango

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005, 2008

Ans. (d) : Hairy styles is a morphological feature which helps in dispersal through wind i.e. anemochory. The fruits and seeds are dispersed during periods of high winds. The fruits of Clematis and Naravelia possess persistent hairy style which help in floating in air.

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590. Select the correct match from the table

List I	List II
1. Capsular fruits	A. Dry, many seeded and split open at maturity
2. Achenial fruits	B. Break into one seeded segments known as mericarps
3. Simple fleshy fruits	C. Have fleshy pericarp which is edible
4. Berry	D. Ripened inflorescence called sorosis.

(a) 1,2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (d) : Achenial fruits do not burst at maturity but seeds are liberated only by the decaying of the pericarp. Berry is usually many seeded, fleshy fruit.
The correct matches are-
Capsular fruits - Dry, many seeded and split open at maturity.
Simple fleshy fruits - Have fleshy pericarp which is edible.

591. Wheat grain is a :
(a) fruit (b) seed
(c) inflorescence (d) bulbil

BHU PMT-2001

Ans. (a) : The wheat grain is a type of caryopsis fruit. Caryopsis fruits are unilocular and one seeded in which pericarp (developed from ovary wall) is fused with the seed coat.
These fruits are present in Graminae family Ex- Wheat, Rice and Maize.
• Inflorescence is the arrangement of flowers and mode of distribution of flowers on the shoot system of a plant eg.- **Hypanthodium in Ficus.**
• Bulbil is the special type of leaf like structure and function as an vegetative reproductive structure eg. As in **Dioscorea.**

592. The cheapest high energy fruit crop in India is:
(a) guava (b) apple
(c) mango (d) banana

HP CET-2013
JIPMER-1998

Ans. (d) : The cheapest high energy fruit crop in India is Banana. Banana are one of the most energy boosting food available. It is very popular fruit due to its low price and high nutritive value with rich source of carbohydrate and vitamin.
• It contains eleven vitamins and the important ones are A, B, C although fat and protein contents are very low, the fruit is rich in minerals.
• Bananas are among the most traded fruits in the world. In 2017 alone 22.7 million tones of banana, excluding plantains, were traded representing almost 20% of global production that year.

593. Which type of fruit is found in pear?
(a) Berry (b) Drupe
(c) Lomentum (d) Pome

UP CPMT-2012

Ans. (d) : Pear is a type of pome fruit which develops from muilticarpellary, multilocular, inferior ovary. Thalamus becomes fleshy and edible part is thalamus. It is fleshy fruit Ex- Pear, Apple.

594. Geocarpic fruits are produced by:
(a) carrot (b) onion
(c) ground nut (d) watermelon

Haryana PMT-2010
AFMC-2007

Ans. (c) : Ground nut is a schizocarpic fruit which develops from monocarpellary, superior ovary. In case of ground nut, the young fruit are pushed into the soil as a result of post ferilization curvature of the stalk. Geocarpy refers to the ripening of fruits underground.

595. Lemon is sour due to the presence of:
(a) acetic acid (b) carbonic acid
(c) citric acid (d) sulphuric acid

AFMC-2002

Ans. (c) : Lemon is sour due to the presence of citric acid. Lemon is a Hesperidium type of fruit. It is similar to berry or bacca fruits but epicarp is thick leathery with oil gland. Mesocarp is white and fibrous fused with epicarp to form Rind of fruit. Endocarp infolded to form unicellular, juicy hairs which is edible part. Lemon belongs to family Rutaceae.

596. Assertion : Coconut tree is distributed in coastal areas over a large part of the world.
Reason : Coconut fruit can float and get dispersed over thousands of kilometers before losing viability
(a) both assertion and reason are true and reason is the correct explanation of assertion
(b) both assertion and reason are true but reason is not correct explanation of assertion
(c) assertion is true but reason is false
(d) both assertion and reason are false

HP CET-2011

Ans. (b) : Coconut is a simple fleshy fruit in which pericarp is differentiated into three layers as epicarp, mesocarp and endocarp. Coconut epicarp is thick and waterproof. Fibrous mesocarp of coconut renders the coconut to float in water for long distance. The stony endocarp provide protection from external injury. Due to all these reason, coconut can be dispersed through water without long viability. Therefore, it is distributed more near the coastal regions.

597. Dry indehiscent single- seeded fruit formed from bicarpellary syncarpous inferior ovary is
(a) caryopsis (b) cypsela
(c) berry (d) cremocarp

BHU PMT (Screening)-2010
AMU- 2000

Ans. (b) : Dry indehiscent single- seeded fruit formed from bicarpellary syncarpous inferior ovary is cypsela. The fruit wall develops from pericarp and thalamus and is thin and remains attached to the seed at one point, Ex- Helianthus.

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598. Pear fruits are gritty due to the presence of
(a) tracheids (b) vessels
(c) fibres (d) sclereids
J&K CET-2012

Ans. (d) : Pear fruits are gritty due to the occurrence of stone cell or sclereids.
Sclereids are small, long not pointed at both ends, thick walled due to the deposition of lignin, extremely thick walled, Lumen very much reduced, cells are more less isodiametric or Spherical or rounded.
Stone cells present in-Pear, Guava, Sapota etc.

599. If a fruit is developed from $\left(\overline{2G}\right)$, bilocular with one ovule in each local and pendulously attached and the wall of the ovary possesses vittae, the fruit is designated as
(a) Caryopsis (b) Cypsela
(c) Cremocarp (d) Capsule
AMU -2000

Ans. (c) : Cremocarp is schizocarpic simple, dry, many seeded fruit which breaks up into one seeded indehiscent part, called mericarps, while dehiscent one seeded part is known as coci, in which fruits breaks up into two mericarps, which remain attached to central axis or carpophore by means of stylopod eg. **coriander, fennel etc.**

600. What is the type of fruit that develops from the ovary of a monocarpellate gynoecium and breaks into several one seeded parts at maturity?
(a) Cremocarp (b) Carcerulus
(c) Regma (d) Lomentum
AP EAMCET-2003

Ans. (d) : Schizocarpic fruits splitted into one or more seeded compartment called the mericarp or cocci
Lomentum is the type of schizocarpic fruit which develops from monocarpellary, superior ovary. Fruit contracted into one seeded segment. Cremocarp develops from bicarpellary, inferior ovary. Fruit dehisces into two mericarp. e.g. - family umbeliferae
Carcerulus fruit:- They develops from bicarpellary to multicarpellary (Labiatae family), Althea, Abutilon (Malvaceae family)
Regma:- develops from multicarpellary ovary dehisces into three cocci. e.g. - castor

601. Single seeded winged fruit is called
(a) achene (b) cypsela
(c) samara (d) caryopsis
Haryana PMT-2007

Ans. (c) : Samara develops from bicarpellary to tricarpellary syncarpous ovary, pericarp froms two wings Ex- Terminalia.
When wings derived from the calyx such as samara fruits are called - samaroid Ex- *Shorea robusta*, Ulmus, Dipterocarpous.

602. The dried fruit used for making musical instruments is
(a) snake gourd (b) bitter gourd
(c) bottle gourd (d) all of these
CMC Vellore-2014
Haryana PMT-2007

Ans. (c) : Bottle dried fruit used for making musical instruments is bottle gourd.
Bottle gourd belongs to family Cucubitaceae develops from tricarpellary, inferior ovary with parietal placentation but seed attached on the placenta.

603. Which one of the following is a pseudocarp?
(a) Apple (b) Guava
(c) Tomato (d) Banana
Haryana PMT-2009
CG PMT-2009

Ans. (a) : A pseudocarpic fruit is not formed by ovary. It is formed from other floral parts like Bracts, perianth and thalamus etc. For example in apple and pear thalamus form the major part in fruit formation.

604. In which of the following types of the fruit is multilocular and split open longitudinally along dorsal sutures?
(a) Capsular (b) Loculicidal
(c) Septicidal (d) Septifragal
Manipal-2015

Ans. (b) : Loculicidal are a multicellular variant of capsular fruits which dehisces along a dorsal sutures present at the back of loculi.
Septicidal dehiscence is one in which the line of dehiscence passes through the septal line.
Capsular fruits are formed from a single cell.
Septifragal fruits dehisces by the loculicidal or septicidal and seed are attached on the central column as thorn apple.

605. Plants which flower only once in their life are termed as
(a) monochlamydous (b) monoecious
(c) monocarpic (d) monosomic
CG PMT-2009

Ans. (c) : On the basis of frequency of flowering or fruiting, plants may be either monocarpic or polycarpic. Monocarpic plants bear flower and fruits only once in their life cycle. Ex- All annual, biennial plants and some perennial plants like Bamboo and Agave. Polycarpic plants develop fruits and flowers repeatedly after attaining maturity Ex- Mango, Acacia, Eucalyptus etc.

606. Winged fruits are found in:
(a) Moringa (b) Pinus
(c) Dioscorea (d) Argemone
AMU-2008

Ans. (c) : Winged fruits are found in Acer, Holoptelea, Terminalia, Dioscorea etc. Samara fruits are winged, dry indehiscent fruits. The wing is modified pericarp that help in seed dispersal. Samara fruits develops from bicarpellary to tricarpellary syncarpous ovary.

607. An alkaloid called capsin is obtained from this plant:
(a) chillies (b) potato
(c) tomato (d) tobacco
AP EAMCET-2001

Ans. (a) : Capsin is a natural alkaloid present in plants of the genus Capsicum such as the chilli plant. There are other forms of spicy alkaloids in the plant itself but their degree of spiciness is lower than that of capsin.
Capsin is derived from the metabolism of a fatty acid and the wall of chilli.

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608. Porous dehiscence of capsular fruits is seen in
(a) okra (b) poppy
(c) cotton (d) datura
AMU-1997

Ans. (b) : Porous dehiscence of capsular fruits is seen in poppy. In poppy, the seeds are liberated through pores, In cotton and okra the seeds are liberated through locules. In datura, the fruits rupture loculicidally throwing valves away from fruit, and leaving seeds attached to the central axis.

609. Explosive fruits are a characteristic of
(a) balsam (b) poppy
(c) castor (d) none of these
AMU-1997

Ans. (c) : Castor fruits shows explosive mechanism in which pericarp after ripening and drying becomes streched due to some external, mechanical pressure as contact with animals, air, water drops or change in humidity. These fruits dehisces suddenly and seed are dispersed in large area.
The seeds of balsam fruits are dry and dispersed by explosion due to the touch of our hands.

610. Fruit of custard apple is:
(a) etaerio of berries (b) etaerio of follicles
(c) etaerio of achenes (d) etaerio of drupes
AFMC-2004

Ans. (a) : Fruits of custard apple (*Annona squamosa*) is etaerio of berries in which the berries are fused but the mesocarp represent the edible part of individual berries. Berry fruits are develops from monocarpellary to multicarpellary may be superior or inferior ovary. Placentation may be axile or parietal. Epicarp is thin, mesocarp fleshy and endocarp also thin but seed get detached from the placenta at the maturity.

611. Opening and closing of flowers represent a kind of
(a) nastic movement
(b) tropic movement
(c) mutation
(d) autonomic movement
VMMC-2005
AMU-2004

Ans. (a) : Nastic movement is non directional movement, in which the direction of response or movement is determined by the structure of responsive region. Opening and closing of the flower is due to variation in light intensity and is an example of photonasty.
Tropic movement is directional paratonic movement of curvature, generally found in cylindrical organ. The direction of movement is related to the direction of stimulus, eg. Geotropism, phototropism, hydrotropism.
Autonomic movement or self controlled movement is spontaneous movement eg. movement shown by shoot apex.
Mutation is defined as sudden change in genetic material of a cell that may cause it to differ in appearance or behaviors from the normal type.

612. Fruit of *Hibiscus esculentus* is
(a) Capsule (b) Cypsela
(c) Legume (d) Pome
MGIMS Wardha-2011

Ans. (a) : Capsule fruit of *Hibiscus esculentus* is capsule.They develops from bicarpellary to multicarapellary, superior or inferior ovary.
• **Cypsela** – They develops from bicarpellary inferior ovary, seed coat and pericarp are free e.g. family compositae.
• **Legume** – They develop from monocarpellary unilocular, superior ovary similar but fruit dehisces by both suture from apex to base as - Leguminosae family like pea, bean etc.
• **Pome** – They develops from multicarpellary multilocular inferior ovary. Thalamus becomes fleshy surround the ovary and edible part is thalamus. It is false fruit as apple, pear.

613. In which of the following types of fruits, dorsiventral dehiscence takes place?
I. Legume **II. Follicle**
III. Siliqua **IV. Capsule**
The correct combination is
(a) I and III (b) I and II
(c) II and III (d) II and IV
VMMC-2010
AP EAMCET-2005

Ans. (a) : Dorsiventral dehiscence takes place legume and siliqua.
Legume and siliqua are dehiscent fruits which can be dehisces through dorsiventral sutures from apex to base. Legume is developed from a monocarpellary, one chambered and superior ovary. Ex- Pea.
Siliqua develops from a bicarpellary, syncarpous and superior ovary. Ex- Mustard.

614. The characteristic fruit type in Asteraceae is:
(a) carcerulus (b) capsule
(c) cypsela (d) caryopsis
AP EAMCET-2002

Ans. (c) : The characteristic fruit type in Asteraceae is cypsela. Cypsela is a dry single seeded fruit formed from a double ovary of which only one ovule develops into a seed. It belongs to Asteraceae family, also called daisy family.
Carcerulus- They develops from bicarpellary to multicarpellary and fruit divided into four single seeded locules, Ex- Ocimum, Salvia (Labiatae family).

615. Hesperidium of orange is a modification of:
(a) berry (b) drupe
(c) pome (d) aggregate fruit
Haryana PMT-2006
DUMET-2006

Ans. (a) : Hesperidium of orange is a modification of a berry with a leathery exocarp. A berry has a fibrous mesocarp fused with epicarp to from rind of fruit, endocarp infolded to form unicellular, juicy hairs which is edible part.
Citrus plants generally have hesperidium fruit.
Ex- Lemon, Oranges, Grape fruit etc.

616. In banana, which of the following part is edible?
(a) Epicarp (b) Mesocarp
(c) Endocarp (d) Both (b) and (c)
Haryana PMT-2003
JCECE-2004
BHU PMT(Main)-2009

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Ans. (d) : In banana, edible part is rudimentary mesocarp and fleshy endocarp. Banana is a type of a berry fruit, which is an indehiscent fruit with fleshy mesocarp and endocarp but fibrus exocarp. Banana is a seedless fruit, if seeded, seeds are present inside the perisperm. Thus, the edible part in banana is mesocarp and endocarp.

617. The capsules are septicidal in:

(a) Ficus (b) Annona
(c) Aristolochia (d) Solanum

AP EAMCET-1997

Ans. (c) : Septicidal capsules are present in the fruit of Aristolochia. In septicidial capsules longitudinal slits appear on the septae and seeds are attached on the septae as in Linum (flaxes).

618. Botanical name of banana is:

(a) *Musa paradisiaca* (b) *Musa arietinum*
(c) *Mimosa pudica* (d) *Iberis amara*

AFMC-2010

Ans. (a) : The botanical name of the banana is *Musa paradisiaca*.

- *Mimosa pudica* is the scientific name of touch me-not plant. This plant collapses its leaves when gets touched by something. It belongs to family Fabaceae.
- *Iberis amara* is a Brassicaceae family plant which is commonly known as candytuft.
- *Musa arietinum* is not the name of any organism.

619. Bitterness of cucurbits fruit is due to ?

(a) Acids in them
(b) Alkalinity in their pulp
(c) Occurrence of tetracyclic triterpenes
(d) Presence of bitter seeds in them

CMC Ludhiana-2007

Ans. (c) : Bitterness in the cucurbits is a form of evolutionary mechanism of defense against the herbivores which develops due to the presence of bitter triterpenes concentrated in the epicarp and the part of mesocarp. The pulp has not alkaline in cucurbits and the seeds are not essentially bitter.

In the plant family Cucurbitaceae, bitterness is caused by a group of highly oxygenated tetracyclic triterpenes, the cucurbitacins.

620. Term torus applies to

(a) spongy thalamus in lotus
(b) swelling in bordered pits
(c) both (a) and (b)
(d) a condensed petiole

CMC Ludhiana-2007

Ans. (c) : Term torus is related to both, spongy thalamus of lotus and a suberized swelling in membrane of bordered pit. The thalamus is thickened structure at the base of flowers.

621. Nucellus forms which of the following part of fruit?

(a) Seed coat (b) Perisperm
(c) Seed (d) Raphe

BCECE-2008

Ans. (b) : Nucellus is the central part of an ovule which contains embryo sac and female gametophyte and it forms a nutritive tissue layer in the seed of flowering plants. Perisperm is the layer of nutritive tissue formed by nucellus. Thus perisperm is the correct answer.

622. The grittiness of the pulp guava fruit is due to presence of

(a) sclereids (b) tracheids
(c) fibres (d) companion cells

AMU-2001

Ans. (a) : The spherical, oval or cylindrical cells with very narrow lumen, in sclerenchyma are called sclereids. They are usually scattered singly or in groups in the plant body specially in phloem, fruit wall and in the pulp of fruits and seeds. They provide rigidity to the structure, in which they are found. The grittiness of the fruits like guava and pears is due to the occurcence of stone cells or sclereids.

623. Cotyledons and testa respectively are edible parts in -

(a) Cashew nut and litchi
(b) Groundnut and pomegranate
(c) Walnut and tamarind
(d) French bean and coconut

AIPMT-2009

Ans. (b) : Cotyledon and testa are edible in groundnut and pomegranate.

Endosperm the white fleshy part is edible part of the coconut.

Cotyledons are the edible part in walnut and cashew nuts.

Aril is the edible part of litchi.

624. How many plants in the list given below have composite fruits that develop from an inflorescence?

Walnut, poppy, radish, fig, pineapple, apple, tomato, mulberry

(a) Two (b) Three
(c) Four (d) Five

AIPMT (Screening)-2012

Ans. (b) : A composite or multiple fruit is a group of fruitlet which develop from the different flowers of an inflorescence. It cosists of two main types-

(i) Sorosis- They develops from the spike, spadix and catkin inflorencence e.g. mulberry, pineapple

(ii)Synconus- They develop from hypanthodium inflorescence. Ex- Peepal, Banyan, Fig.

- Poppy has capsular fruit.
- Tomato is a berry fruit.
- Radish is a tuber.

625. Arrange the following fruits in descending order based on the number of locules in the ovary from which it develops

(i) Carcerulus (ii) Schizocarp
(iii) Cremocarp (iv) Regma

(a) ii, i, iv, iii (b) i, iv, iii, ii
(c) ii, iv, iii, i (d) ii, iii, i, iv

AP EAMCET-2008

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Ans. (a) : The maximum number of chamber in the ovary are present in schizocarpic fruits. Order of the chambers of the ovary-
Schizocarp > Carcerulus > Regma > Cremocarp

626. Fruits are formed in
(a) brassica (b) fern
(c) cycas (d) funaria

UP CPMT-2005

Ans. (a): Fruit formation is a characteristic feature of Angiosperms such as Brassica while fern, cycas and Funaria lack flower.
- Funaria is a bryophyte in which true stem, root, leaves are absent.
- Cycas is a gymnospermic plant which is a naked seed plant and fruits are not formed.
- Fern belongs to pteridophyta, ferns are plants that do not have flowers.

627. Among the following sets of fruits, those that belong to the same category, from the point of view of classification, are
(a) coconut, chestnut and cashewnut
(b) coconut, mango and almond
(c) coconut, butternut and chestnut
(d) coconut, orange and tomato.

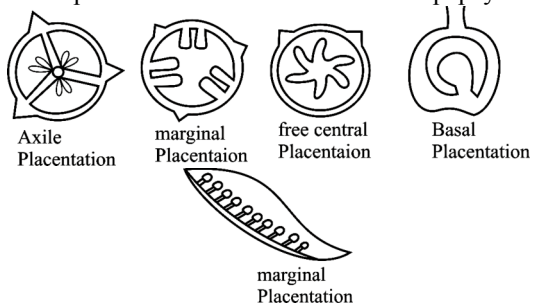
AMU-1997

Ans. (b) : The coconut, mango and almond are all drupes. These fruits develop from monocarpellary or multicarpellary, syncarpous ovary. Epicarp of these fruits forms the skin of the fruit. Orange is hesperidium berry and tomato is a true berry whereas coconut is a drupe.
Chestnut and coconut are drupes whereas betelnut is a nut.

628. Placentation in tomato and lemon is:
(a) Marginal (b) Axile
(c) Parietal (d) Free central

AIPMT (Screening)-2012

Ans. (b) : Placentation found in tomato is axile in which placenta arise from the central axis of ovary.
Lemon (family Rutacace) tomato (family solanaceae) also china rose and orchid have axile placentation.
In Axile placentation the ovary is fragmentated into two or more than chambers by septa.
The placenta is formed in the central region where all the septa intersect or meet and therefore an axile column bearing ovule is formed.
Marginal placentation is found in pea.
- Free central placentation found in Dianthus.
- Parietal placentation found in Radish and papaya.



629. A small dry, one – seeded fruit with its pericarp fused with the seed-developing from a monocarpellary gynoecium is called
(a) Cypsela (b) Siliqua
(c) Caryopsis (d) Samara

Rajasthan PMT-2011

Ans. (c) : Caryopsis is a very small, dry, one seeded fruit developing from superior monocarpellary ovary, with the pericarp fused with the seed coat.
Ex. Family Gramineae
Cypsela - They develop from bicarpellary inferior ovary seed coat and pericarp are free as - Family compositae. (Sunflower, marigold)
Siliqua - They develop from bicarpellary, ovary dehisces by both surface from base to apex, in the begining ovary is unilocular but becomes bilocular due to the false septum called the Replum
Example:- Crucifereae family (Brassica, Radish)
Samara -They develop from bicarpellary to tricarpellary ovary, pericarp form the wings.
Ex. - *Holoptelia, Termindia* etc.

K. Seed and Structure of Seed

630. Match the following :

List - I	List -II	List -III
(A) Persperm	**(I) Zygote**	**(i) Coconut**
(B) Embryo	**(II) PEN**	**(ii) Pepper**
(C) Scutellum	**(III) Nucleus**	**(iii) Tridax**
(D) Endosperm	**(IV) Cotyledon**	**(iv) Maize**

(a) A-I-ii, B-III-i, C-II-iv, D-IV-iiii
(b) A-II-ii, B-I-iii, C-III-iv, D-IV-i
(c) A-II-ii, B-III-ii, C-I-iii, D-IV-i
(d) A-III-ii, B-I-iii, C-IV-iv, D-II-i,

TS EAMCET-10.05.2023, Shift-II

Ans. (d) : • Edible part of coconut is endosperm dut to formation of zygote coconut is a drupe fruit fibrous part called mesoderm and stony layer called endoderm.
- In some seed the nutrelive tissue nucllus present outside the sac containg the embryo presist such nucellus called perisperm. It seen in pepper.
- Cotyledon of maize grain called scutellum. It is very thin but high surface Area, high absorbing nutrient.

631. Choose the correct statements
a. Inability of seed germination due to immature embryo is called Quiescence.
b. Seed coats of fabaceae do not absorb O_2 and H_2O
c . Germination of tomato seeds is inhibited by chemical compounds
d. Seed of polygonum require exposure to low temperature.
(a) a, b, c, d (b) b, c, d
(c) c, d (d) a, b, d

AP EAPCET-22.05.2023, Shift-I

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Ans. (b) : In seed coat of Fabaceae (Leguminosae), sclerencymatic tissues and waxy covers are cause of difficulty of the entry of O_2 and water.

- Germination of tomato seeds is inhibited by isotonic solutions of sucrose and glucose.
- Treatment of seed is require exposer of low temperature to break its dormancy and to induce germination.

632. Assertion (A) : Dry Dehiscent fruits are usually single seeded.
Reason (R) : Tridax fruit is cypsella with pappus like calyx.

(a) A and R are true and 'R' is the correct explanation to 'A'
(b) A and R are true 'R' is not the correct explanation to 'A'
(c) A is true but R is false
(d) A is false but R is ture

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Tridax is a flowering plant in the family asteraceae. Pappus like calyx and cypsela is a characterstic fruit of the family asteraceae. It is dry single-secded fruit formed from a double ovary of which only one develops into a seed.

A dry dehiscent, one-seeded fruit, similar to those in the Asteraceae family which are produced from two ovaries, only one of which bears seeds.

633. Assertion (A): There is no variation in size of mature seeds in orchids.
Reason (R): Lodecia maldivica is the plant with largest seed.

(a) 'A' and 'R' are true and 'R' is the correct explanation to 'A'.
(b) 'A' and 'R' are true but 'R' is not the correct explanation of 'A'.
(c) 'A' is true but 'R' is false.
(d) 'A' is false but 'R' is true.

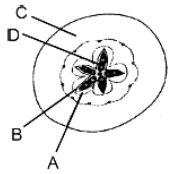
AP EAPCET-23.05.2023, Shift-II

Ans. (d) : Lodoicea maldivica, is a type of palm tree and also known as the double coconut is producing the largest and for heaviest seeds in the world. The weight of seeds is up to 20 kg and are almost 40 cm in diameter which makes them the largest and heaviest seeds in the world.

Orchid seeds are very small, extremely light and produced in great numbers. The typical orchid seed is merely the size of a speck of dust.

Thus, Assertion (A) is false but Reason (R) is true.

634. Which part of the fruit, labelled in the given figure makes it a false fruit?



(a) D → Seed
(b) A → Mesocarp
(c) B → Endocarp
(d) C → Thalamus

NEET-2022

Ans. (d) : As thalamus is involved in fruit formation. Therefore, it is a false fruit.

False fruit is also known as **accessory fruit, spurious fruit, pseudofruit psuedocarp**. A false fruit is a fruit in which some of its flesh is derived not from the the floral ovary but from some other tissue located exterior to the carpel i.e. some other reproductive part of the flower. **eg-** Apple, Pear, Pineapple, Strawberry etc.

- Apple is formed from the thalamus and not from the ovary . So it is known as **false fruit**.

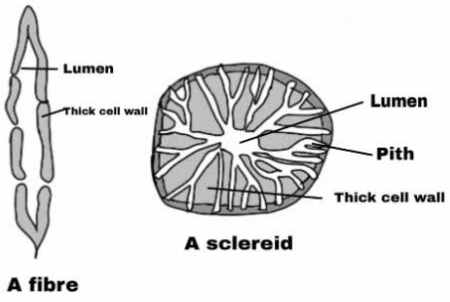
635. The type of tissue commonly found in the fruit wall of nuts is:

(a) Parenchyma
(b) Collenchyma
(c) Sclerenchyma
(d) Sclereid

NEET (Re-Exam)-04.09.2022

Ans. (d) : Sclereids are a reduced form of sclerenchyma cells.

Sclereids are usually found in the fruit walls of nuts, pulp of fruits like guava, pear and sapota; seed coats of legumes and leaves of tea. The gritty texture of pear or guava is because of sclereids.



636. _____gives seeds protection against mechanical shock, dry conditions etc.

(a) Testa
(b) Tegmen
(c) Scutellum
(d) Endosperm

MHT CET-07.10.2020 Shift-I

Ans. (a) : The outer seed-coat is called testa. It is thick and protective layer. It protects the seed from bacteria fungi , insects etc.

The inner seed-coat is called tegmen. It is thin, membranous covering that protects the inner part of the seed.

637. Some seeds produce various structures like wings, pappus calyx, hooks etc, which help in their_____.

(a) protection
(b) dispersal
(c) attraction
(d) germination

MHT CET-06.10.2020 Shift-I

Ans. (b) : Seed dispersal is the mechanism that helps in the transport of seeds to other place pappus calyx, wings, hooks etc. helps in the dispersal of seed.

Pappus is the modified calyx.

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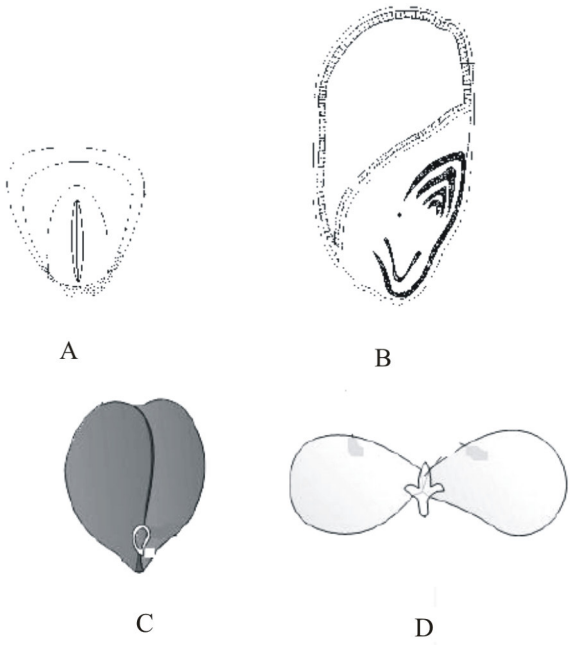
638.



Which of the following is correct for above diagrams :

(a) A and B represent ex-albuminous seeds
(b) C and D represent albuminous seeds
(c) A and B represent albuminous seeds
(d) C and D represent perispermic seeds

AIIMS-26.05.2019 Shift-II

Ans. (c) : In albuminous seeds the cotyledons is thin and membranous and the endosperm persists and nourishes the seed during the early development of the seed. Cotyledons function only as food sucking organs, not as food storage organs Example as castor seed, coconut and maize. In the given diagrams A and B represent albuminous seeds.

- Seeds which lack endosperm at maturity are called non-endopermic or ex-albuminous seeds. Example as pea, bean and groundnut.

639. Which of the following is not found in maize seed:

(a) Coleorhiza (b) Coleoptile
(c) Scutellum (d) Perisperm

AIIMS-26.05.2019 Shift-II

Ans. (d) : Perisperm is a layer of nutritive tissue that surrounds the embryo of a seed. There are three parts in an ovule The integument that form the outer layer, nucellus and the female gametophyte in its center. Nucellus in the inner structure of the ovule which may develop into the perisperm that feeds the embryo.

In maize seeds the perisperm is absent. As maize is a monocot coleorhiza, coleoptile and scutellum are found in maize. Hence perisperm is not found in maize seed.

640. 'Scutellum' is the _____ of monocotyledonous plant.

(a) embryo axis (b) cotyledon
(c) endosperm (d) coleoptyle

Tripura JEE-2019

Ans. (b) : Typical dicotyledonous embryo contains two cotyledons. The portion above the level of cotyledons is called epicotyl (embryonic shoot) or plumule and portion below the level of cotyledons is known as hypocotyls (embryonic root) or radicle embryo of monocotyledons have only one cotyledon called scutellum.

641. Persistent nucellus in the seed is known as

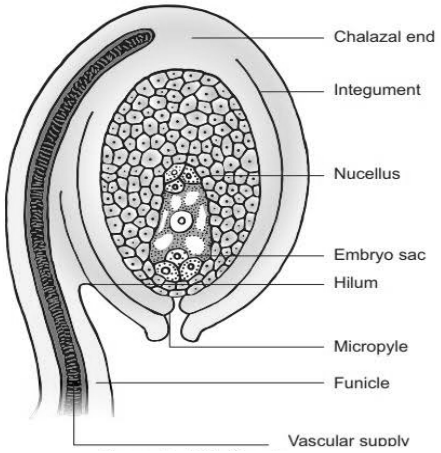
(a) Perisperm (b) Hilum
(c) Tegmen (d) Chalaza

NEET-2019

Ans. (a) : The residual persistent nucellus in the seed is called perisperm.

- Perisperm is the nutritive tissue derived from persistent nucellus that surrounds the embryo of seed in some angiosperm.
  eg – Black pepper, Beet.
- Nucellus is the central cellular mass of the body of ovule, containing the embryo sac.

Helium-Helium is scar left by the stalk which attached the ovule to the ovary wall before it become seed.



642. Placentation in which ovules develop on the inner wall of the ovary or in peripheral part, is

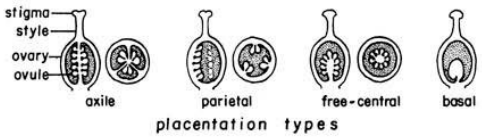
(a) Axile (b) Parietal
(c) Free central (d) Basal

NEET-2019

Ans. (b) : Placentation - ovules are attached to the inner wall of ovary called placenta and arrangement is called placentation.

In parietal placentation, the ovules develop on the inner wall of the ovary or in the peripheral part.

eg - Mustard, Argemone, etc.



643. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other dicotyledons

(a) Aleurone layer (b) Plumule
(c) Radicle (d) Cotyledon

JCECE-2018

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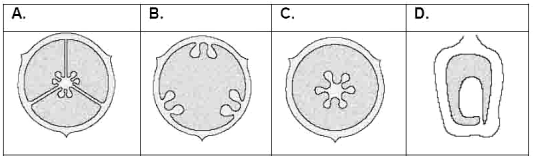
Ans. (d) : Embryo of monocotyledons have only one cotyledons called scutellum.

• The embryonic axis runs the length of the embryo. On end of the embryonic axis is the plumule, the young shoot apex, which includes the shoot apex. Which includes the shoot apical meristem and developing leaf primordia. At the other end of the embryonic axis is the radicle.

• The embryonic axis does not include the catyledons. The portion of the embryo between the cotyledon attachment point and the radicle is known as the hypocotyl.

The portion of the embryonic axis between the cotyledon attachment and the shoot tip is the epicotyl.

644. Select the correct matching



(a) A – Tomato, B - Argemone, C- Dianthus, D - Sunflower
(b) A – Dianthus, B - Argemone, C- Tomato, D - Sunflower
(c) A – Tomato, B - Sunflower, C- Dianthus, D - Argemone
(d) A - Argemone, B - Tomato, C- Dianthus, D - Sunflower

AIIMS-26.05.2018 Shift-II

Ans. (a) :

Placentation - The arrangement of ovules within the ovary is known as **placentation**.

• When the placenta is axial and the ovules are attached to it in a multilocular ovary the placentation is called as axile.

eg- China rose, Tomato and Lemon.

• The ovule develops on the inner wall of the ovary or on peripheral part, is called as **parietal placentation**.

eg- Mustard and Argemone.

• When the ovules are borne on central axis and septa are absent is called **free central placentation.**

eg- Dianthus and Primose.

• The placenta develops at base of ovary and a single ovule is attached to it is called **basal placentation**.

eg- Sun flower and Marigold.

645. Albuminous seeds are found in

(a) Pea, Groundnut, Castor
(b) Castor, Sunflower, Barley
(c) Wheat, Barley, Castor
(d) Pea, Groundnut, Sunflower

AIIMS-26.05.2018 Shift-II

Ans. (c) : Albuminous seeds are those seeds that restores some part of endosperm during the embryonic development.

For example-Maize, Barley, Castor, Wheat and Sunflower.

• **Non albuminous seeds** like that consume the entire endosperm during embro development.

Example - Groundnut and Peas etc.

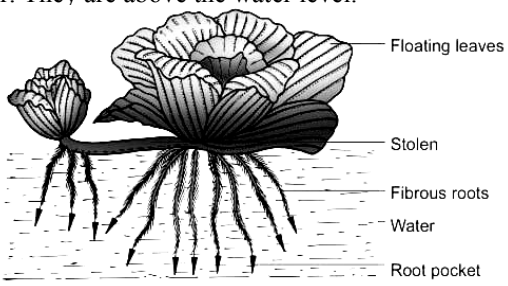
646. Pollination in water hyacinth and water lily is brought about by the agency of

(a) water (b) insects or wind
(c) birds (d) bats

NEET-2016 Phase-II

Ans. (b) : Water hyacinth and water lily despite being hydrophytes, shows pollination by insects or wind, not by water.

• This is because the flowers are not submerged in water. They are above the water level.



647. Heterospory and seed habit are exhibited by a plant possessing :

(a) petiole (b) ligule
(c) bract (d) spathe

BVP-2000
Haryana PMT-2001

Ans. (b) : Heterospory means production of two different sizes of spores - megaspore and microspore. Ligule the word ligule comes from latin "ligula" which mean strap. It is a thin outgrowth at the junction of leaf and leafstalk.

eg:- *Selaginella, marsilea, Azolla, Salvinia* etc.

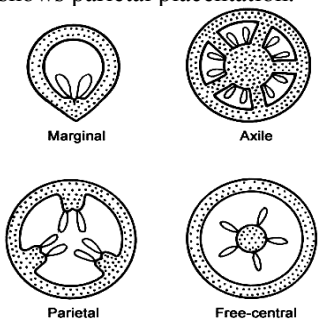
648. Axile placentation is present in

(a) Argemone (b) Dianthus
(c) Lemon (d) Pea

AIPMT (Re-Exam)-2015

Ans. (c) : Placentaion refers to the arrangement of ovules within the ovary.

• Axile placentation is seen in Lemon, chinarose and tomato.
• Free central placentation in dianthus and stellaria,
• Pea shows marginal placentation.
• Argemone shows parietal placentation.



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• Axile placentation is the type of placentation in which carpels are folded inward with ovules placed along the central axis of the ovary.
Placenta is axial and the ovules are formed at the angles where the septa Join central placenta.

649. Non-albuminous seed is produced in:-
(a) Maize (b) Castor
(c) Wheat (d) Pea

AIPMT-2014

Ans. (d) : Pea is an example of a non-endospermic seed. Endosperm is the nutritive tissue that is found in seeds. In dicots, the endosperm is remobilized into the developing cotyledon which functions as the storage tissues.
Maize, castor and wheat are endospermic or albuminous seeds. Endosperm is a food reserve for the developing plant embryo. Food reserve is in the form of starch, proteins, oils and other nutrients. Except orchids most of the monocotyledonous seeds are endospermic.

650. Which one of the following statements is correct?
(a) The seed in grasses is not endospermic
(b) Mango is a parthenocarpic fruit
(c) A proteinaceous aleurone layer is present in maize grain.
(d) A sterile pistil is called a staminode

AIPMT-2014

Ans. (c) : Grasses belongs to poaceae family and its seeds are endospermic.
• Mango is a seeded fruit.
• A sterile stamen is called staminode e.g. of sterile flower **Ray Florets of Sunflower.**
• The cells of aleurone layer are filled with proteinaceous aleurone grains which play an important role at the time of germination.

651. Seed coat is not thin, membranous in :
(a) Gram (b) Maize
(c) Coconut (d) Groundnut

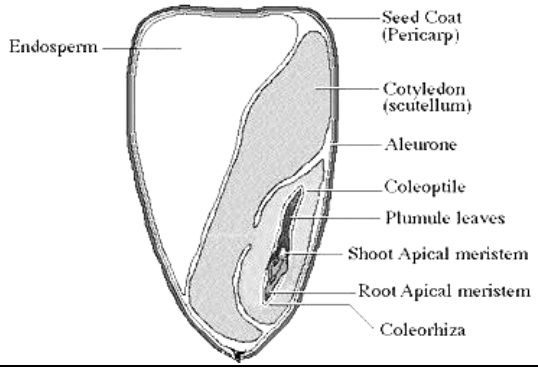
NEET-2013

Ans. (c) : Seed coat is the outer protective covering of seeds that resist deterioration of the quality of seeds.
The seed coat develops from the two integument or it is formed by outer layers of ovules cell. The seed coats are modified distinctly in different species of plant. In drupes that are fleshy fruits, the seed coat is usually membranous. It has an outer fleshy part called exocarp or skin that is surrounded by mesocarp or flesh form inside. The mesocarp further encloses a shell of hardened endocarp having a seed inside it.
In Gram, Maize and Ground nut thin membranous seed coat are present. Groundnut is a dry dehiscent fruit known as legume. Gram and Maize are indehiscent dry fruit known as grain or caryopsis.

652. In a cereal grain the single cotyledon of embryo is represented by
(a) Coleorhiza (b) Scutellum
(c) Prophyll (d) Coleoptile

AIPMT-2006

Ans. (b) : Cereal grain is a monocotyledonous seed. In the monocot seed, cotyledon is represented by the structure called **scutellum.**
Scutellum is the one large shielded cotyledon of a monocot plant. In germinating grains, the scutellum allows the transport of nutrients from the starchy endoperm to the growing embryo.



653. Which of the following crops have been brought to India from new world : -
(a) Cashewnut, potato, rubber
(b) Mango, tea
(c) Tea, rubber, mango
(d) Coffee

AIPMT-2002

Ans. (a) : Cashew plants native to south and central America are mostly grown in Central America, the caribbean and Northern South America, including Northeas Brazil.
• Potato is a native to South America. The major potato growing countries include the USA, Russia, France, Poland, UK etc.
• The rubber tree is a native of the southern Amazon valley in South America.
• Mango is native to Southern Asia (China).
• The Common coffee is native to Abyssinia.

654. Geocarpic fruit is : -
(a) Potato (b) Peanut
(c) Onion (d) Garlic

AIPMT-2002

Ans. (b) : Geocarpy is a very rare type of plant reproduction. Geocarpic means producing or ripening the fruit beneath the surface of the ground. So ground nut (Peanut) is the best example of geocarpic fruit.

655. Which type of association is found in between entomophilous flower and pollinating agent : -
(a) Mutualism (b) Commensalism
(c) Coperation (d) Co-evolution

AIPMT-2002

Ans. (a) : Mutualism is a biological interaction between organisms of different species in which each individual receives the benefited. **Entomophilous flower** and pollinating agent are shows the mutualistic relationship. The plant uses its pollinator to ensure cross-pollination while pollinator uses the plant as food.

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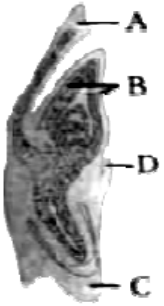
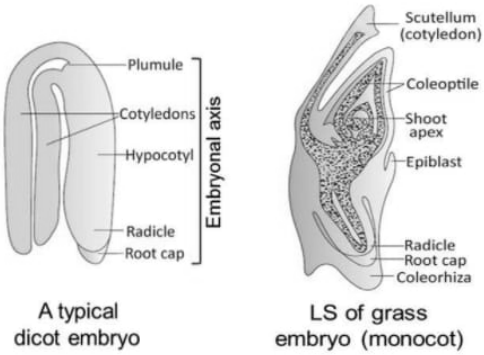
656. Identify the parts labeled A, B, C and D in the given figure and select the correct option.



(a) A–Scutellum; B–Epiblast; C–Coleoptile; D–Coleorhiza
(b) A–Scutellum; B–Coleorhiza; C–Coleoptile; D–Epiblast
(c) A–Scutellum; B–Coleoptile; C–Coleorhiza; D–Epiblast
(d) A–Epiblast; B–Coleoptile; C–Coleorhiza; D–Scutellum

AIIMS-2016

Ans. (c)



A. Scutellum– It is a membrane absorbing nutrients from the endosperm, transferring sugars and amino acids to the developing plant.
B. Coleoptile– Formatin of shoot parts they help in the emergence of the first leaf by protecting it during its passage through the soil.
C. Coleorhiza– Formation of root parts acts as a defense layer for the root and the root cap.
D. Epiblast– It is secondary cotyledon. It store and supplies nutrients to the developing plant.

657. In which one of the following would you expect to find glyoxysomes ?

(a) endosperm of wheat
(b) endosperm of castor
(c) palisade cells in leaf
(d) root hairs.

AIIMS-2005

Ans. (b) : Glyoxysomes are the specialized peroxisomes that contain enzymes for β-oxidation of fatty acids and glyoxylate pathways. It is abundant in germinating oilseeds. They are basically responsible for the glyoxylate cycle in which fats is converted into carbohydrates. Glyoxysomes are found in the endosperm of castor because it contains oil but not found in wheat because it is carbohydrate rich.

658. In groundnut the food/oil reserve is present in

(a) epicarp (b) mesocarp
(c) endosperm (d) cotyledons

AIPMT-1990

Ans. (d) : Cotyledons are the leaves of embryo usually store food for the use of embryo during development Groundnut is economically important plant as edible oil is obtained form the cotyledons. Peanuts are a significant source of **resveratrol** a chemical studied for potential anti-aging effects.

659. Which plant will lose its economic value if its are produced by induced parthenocarpy?

(a) Orange (b) Banana
(c) Grape (d) Pomegranate

AIPMT-1997

Ans. (d) : Seeds having fleshy testa are the edible parts in pomegranate. Thus parthenocarpic seed can not be produced in pomegranates.
Parthenocarpy is the production of fruit without fertilization of ovule the production of fruits which pollination is difficult.

660. For the germination of which of the following dormant seeds, would you recommend scarification method as an effective treatment?

(a) coconut (b) rice
(c) cotton (d) sorghum

AP EAMCET-1998

Ans. (c) : Seed scarification is a technique to physically damage the seed coat to reduce hard seed while keeping the seed viable. To break the dormancy and to promote the germination, scarification process is applied. Seed-coat is very hard in cotton.

661. The embryo of sunflower has:

(a) one cotyledon (b) two cotyledons
(c) many cotyledons (d) scutelum

BHU PMT-2002

Ans. (b) : Typical dicotyledonous embryo contains two cotyledons. Sunflowers have two cotyledons when its seed germinates.

662. The plant part which can respire without oxygen is?

(a) Root (b) Stem
(c) Seed (d) Leaf

Rajasthan PMT-1996

Ans. (c) : Seeds undergo anaerobic respiration to release energy in the absence of oxygen. Therefore seed can respire without oxygen.
Roots respire in presence of oxygen and they die in anaerobic conditions
Leaf and stems exchange gases from the atmosphere due to the presence of stomata. In the absence of oxygen stem and leaf cell undergoes death.

663. The orthodox seed is found in (1) coconut (2) legumes (3) jack fruit (4) cereals

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2009

@apna_pdf

Ans. (c) : Orthodox seeds (Recalcitrant seeds)- Seed which have ability to with sand in low moisture and temperature. Cereals legumes, can tolerate reduction in moisture content, exposure to low temperatures and anaerobic conditions.

664. The examples of cellular endosperm are (1) Citrus, Malea, Primula (2) Adoxa, Cetranthus, Datura (3) Phoenix, Acer, Arachis (4) Impatiens, Magnolia, Cetranthus

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2009

Ans. (c) : Endosperm is a nutritive tissue for developing embryos in Angiosperms.When the primary endosperm mother cell divides by mitotic divisions and each division is followed by a cell wall formation, it is known as cellular endosperm, eg. Adoxa, Cetranthus, Datura, Impatiens, Magnolia etc.

• In angiosperm, the endosperm develops from a tripoid (3n) primary endosperm nucleus which is formed as a result of the fusion of a male gamete with the secondary nucleus of central cell.

665. Edible oil is obtained from seeds of : (1) *Helianthus annuus* (2) *Helianthus tuberosus* (3) *Carthamus tinctorius* (4) *Bells perennis*

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (d) : Edible oil is derived from sunflowers (*Helianthus annuus*) seeds. It is safe to use in cosmetic and skin care products. It is non - volatile air which is pressed from the sunflower seeds.
Carthamus tinctorius is a high linoleic acid oil (70%) and has only smaller amounts of oleic acid (11%). It contains antioxidant vitamin(E) and might help in reducing the risk of heart diseage.

666. Micropyle occurs in : (1) seeds (2) ovule (3) ovary (4) stigma

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (b) : Micropyle is an opening part of the embryo which is covered by the integuments in ovules, after fertilization ovules are converted into seeds. So, micropyle occurs in both ovule and seed.

667. A seed which does not require oxygen for germination ? (1) Pea (2) Rice (3) Onion (4) Typha

(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005, 2008

Ans. (c) : Rice and Typha can be stored for long time as they can tolerate reduction in moisture content (upto 5%) exposure to low temperature and anaerobic conditions. Rice and Typha seeds are able to germinate anaerobically by means of coleptile elongation.

668. Orchid seeds are

(a) large and sticky (b) Small and hairy
(c) Small and light (d) Large and heavy

BHU PMT (Mains)-2011

Ans. (c) : Orchid seeds are small, dry and light weight and can be carried by wind to over 1000 kms. These are smallest seeds (0.004 mg) is angiosperms.

669. A simple one seeded fruit, in which pericarp is fused with seed coat is

(a) Achene (b) Caryopsis
(c) Cypsela (d) Nut

J&K CET-2008

Ans. (b): Caryopsis is a specialized type of dry, one - seeded fruit (achene), characteristic of grasses, in which the ovary wall is united with the seed coat. Buckwheat is exception of caryopsis. Caryopsis is a type of simple fruit.

• Achene is a small, dry one seeded fruit but this fruit does not open to release the seed.

• Nut is a type of fruit that has edible seed and is covered with a hard inedible shell.

• Cypsela is a dry, one seeded fruit developing from a syncarpous, inferior, bicarpellary ovary.

670. Parachute mechanism of seed dispersal is seen in:

(a) Poppy (b) Helianthus
(c) Plumbago (d) Lotus

JCECE-2005
Manipal-2000

Ans. (b) : Parachute mechanism:- some seeds are light and float in the wind. These seeds land and grow in new places.
It is a characteristic of family compositae (Asteraceae family), e.g. Helianthus (sunflower).

671. Aleurone grains are rich in:

(a) fat (b) protein
(c) carbohydrates (d) auxins

HP CET-2011
Rajasthan PMT-2007

Ans. (b) : The Aleurone layers are found around the peripheral part of endosperm of monocot seed. These grains are rich is protein specially hydrolytic enzymes.

672. Seed may be defined as

(a) Ripened ovule (b) Fertilized ovary
(c) The gynoecium (d) Embryo

BHU PMT (Screening)-2007

Ans. (a) : After fertilization, ovary is converted into fruit and ovule is converted into seed. So, seed may be defined as ripened ovule and fruit may be defined as ripened ovary or fertilized ovary.

673. The portion of embryonal axis above cotyledon is called as

(a) epicotyl (b) hypocotyl
(c) coleoptile (d) radicle

J&K CET-2012

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Ans. (a) : The portion of embryo below the attachment of cotyledons is called hypocotyl (contains radicle) and portion of embryo above the attachment of cotyledons is called epicotyl (contains plumule)

674. Seeds possess spongy aril in

(a) Eichhornia (b) Potamogeton
(c) Sagittaria (d) Nymphaea

BCECE-2010

Ans. (d) : Seed possess spongy aril in Nymphaea (water lily). The fruit dehiscence by the swelling of mucilage surrounding the seeds. Thus the seed become free. The seeds arillated and they are enclosed in an additional layer of cell i.e. aril. It is a spongy layer of cells having air spaces in between. So, it provides buoyancy to the seeds.

675. The seed coat in both gymnosperms and angiosperms is derived from the

(a) megaspore (b) microspore
(c) megasporangium (d) microsporangium

AMU-1999

Ans. (c) : Megasporangium is a sporangium which produces only megaspores. It produces female gametes or megaspores.

676. The conspicuous protein-storing layer of endosperm in cereal grains Contains

(a) ribosomes (b) microbodies
(c) aleurone grains (d) starch grains

AMU-1999

Ans. (c) : Aleurone grains:- They represent the storage proteins which are generally insoluble and occur inside special leucoplasts called **aleuroplast**.

677. How does the ephemeral Tripulus tide over the dry conditions?

(a) By its tuberous stem
(b) By its aerial stem
(c) By lying in the forming of seeds
(d) By storing water in different parts of its body

AP EAMCET-2003

Ans. (c) : Ephemeral are short lived xerophytes which do not have capacity to endure or tolerate drought. At the return of favorable conditions which are for a very short duration then seeds germinate in new plants they emerge during early spring or rainy season

678. Each carpel of Gloriosa encloses 60 ovules, out of which 27% became abortive and another 13% could not be fertilized due to various reasons. How many seeds occur in the capsule if all the remaining ovules are fertilized in the lone flower of the plant?

(a) 36 (b) 76
(c) 108 (d) 180

AP EAMCET-2004

Ans. (c) : Ovules in the ovary become seeds when the ovary is developing into a fruit.

Since Number of fertilized ovule will be equal to number of seeds produced

Gynoecium of Gloriosa contains 3 carpels, number of ovules in each carpel is given = 60

Therefore, number of ovules in 3 carpels = 60 × 3 = 180

abortive ovules = 27%

unfertilized ovules = 13%

Therefore, total number of fertilized ovules = 100 – (27 – 13) = 60

So, No of seeds in a cone flowers of Gloriosa = 60% of

$180 = \frac{60 \times 180}{100} = 108$

679. Study the following table:

List-I (Structure before seed formation)	List–II (Structure after seed formation)
A. Funiculus	1. Hilum
B. Scar of ovule	2. Tegmen
C. Zygote	3. Testa
D. Inner integument	4. Stalk of seed
	5. Embryo

Identify the correct match.

	A	B	C	D
(a)	4	1	5	2
(b)	3	4	1	5
(c)	5	1	2	4
(d)	4	5	3	2

AP EAMCET-2004

Ans. (a) : Funiculus:- The stalk by which on ovule or seed is connected to the placenta in the ovary.

Funiculus after seed formation develope into the stalk of seed.

Scar of ovule:- The body of the ovule fused with the funicle in the region called hilum. The hilum is the scar that is present on the seed

Zygote:- The fertilized egg is called zygote. The two celled zygotic stage till the initiation of organs in embryo is commonly called proembryo stage

Inner Integument:- Ovule has one or two protective envelope called integuments. The inner integument forms the tegmen

680. The outermost layer of maize endosperm is known as

(a) perisperm (b) aleurone
(c) tapetum (d) endothelium

Haryana PMT-2007

Ans. (b) : Endosperm is the most nutritive tissue for developing embryos in angiosperms. The outer - most layer of maize endosperm is known as aleurone. The cell of aleurone layers are filled with proteinaceous aleurone grains which play an important role at time of germination.

681. The part of the castor seed that yields oil is

(a) cotyledon (b) caruncle
(c) endosperm (d) nucellus

CG PMT-2009
Haryana PMT-2009

Ans. (c) : The part of the castor seed that yields oil is endosperm. Endosperm is a nutritive tissue for developing embryo and also contain protein and oils. castor oil is a nutrient-rich vegetable oil that is used for skin, hair, constipation and in many other cases.

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Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

682. Consider the following statements
(1) the seed of pea is exalbuminous
(2) the fruit of peach is drupe
(3) the seed of tomato is albuminous
(4) the fruit of coconut is berry
(a) 1, 2 and 3 are correct.
(b) 1 and 2 are correct.
(c) 2 and 4 are correct.
(d) 1 and 3 are correct.

BHU PMT (Mains)-2008

Ans. (a) : Albuminous seed :- These are the seeds where endosperm still persists after development till maturity.
Example :- Wheat, maize, barley, sunflower, coconut and castor etc.
Exalbuminous seed:- In this type, the endosperm is completely consumed during development.
Example:- Pea, bean etc.
• Drupe is a fleshy fruit with thin skin and a central stone containing the seed
ex – Mango, Coconut, Peach etc.
• The seed of tomato is albuminous.

Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

683. The seeds, which have separate endosperm
(1) maize (2) onion
(3) rice (4) bean
(a) 1, 2 and 3 are correct.
(b) 1 and 2 are correct.
(c) 2 and 4 are correct.
(d) 1 and 3 are correct.

BHU PMT (Mains)-2008

Ans. (a) : Endospermic or albuminous seeds are those seeds which have stored their food materials in endosperm. eg. maize, onion, rice.
The seeds which stored their food materials in cotyledon are called non-endospermic seeds. eg. pea, bean.

684. The cotton thread fibres are
(a) fibres taken out from stem
(b) epidermal hair of seed
(c) epidermal hair of fruits
(d) fibres taken out from roots

CG PMT-2006

Ans. (b) : Cotton fibers come from plants in the malvales order, which is a part of the malvaceae family. Cotton fibers are trichome or seed coat hairs that emerge from the developing cotton seed's epidermal cells. So, cotton fibres are actually epidermal hairs of seeds.

685. Pure cellulose is obtained from
(a) root hairs (b) stem hairs
(c) leaf hairs (d) seed hairs

BHU PMT (Screening)-2011

Ans. (d) : Pure cellulose is odorless, flavorless, hydrophilic, insoluble in water and biodegradable. It has melting point of 467° C. It is obtained from seed hairs.

686. In pulses the proteins are stored in:
(a) endosperm (b) cotyledons
(c) pericarp (d) seed coat

AP EAMCET-2002

Ans. (b) : Cotyledon is also known as the storage unit of a seed, as it provide nutrients to the different parts of an embryo. It refer to the significant part of the embryo found within the seed. So, in pulses the proteins are stored in cotyledons.

687. The number of cotyledons in Cuscuta are:
(a) one (b) two
(c) always polycotyl (d) none of these

Haryana PMT-2003

Ans. (d) : Monocotyledons comprises a single cotyledon emerging from the seeds after seed germination where as two cotyledons emerging from the seeds after seed germination is known as dicotyledonous. Cuscuta is a dicot plant has no cotyledons because they are converted into a thread like hypocotyls. It is parasitic flowering plant that is found in the tropical and temperate regions.

688. Seeds which are able to withstand reduction in moisture and temperature are called:
(a) dormant seeds (b) orthodox seeds
(c) recalcitrant seeds (d) non-viable seeds

CMC Vellore-2007

Ans. (b) : Orthodox seeds can withstand in low moisture and temperature. It can be stored for long time and they can tolerate reduction in moisture content exposure to low temperature and anaerobic conditions.

689. The remnant of nucellus in the seed is:
(a) endosperm (b) aril
(c) cotyledon (d) perisperm

AP EAMCET-2000

Ans. (d) : Persistent nucellus is called perisperm. It persist outside the endosperm as a thin layer.
In some seeds such as black pepper and beet, remnants of nucellus are also persistent. This residual, persistent nucellus is the perisperm.

690. Seed habit was first originated in
(a) ferns (b) cycadofilicales
(c) gymnosperms (d) mosses

CMC Ludhiana-2007

Ans. (a) : The production of two types of spores in heterosporous plants.
(i) The smaller ones are called microspores.
(ii) The larger ones are called megaspores.
• Experimental studies on selaginella and marsilea suggest that nutritional factors mainly govern the heterospory.
• Seed habit is the most complete end evolutionary successful method of sexual reproduction.
• Cycadofilicales:- An extinct order of gymnosperms that flourished in the carboniferous period.

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691. A fruit in which seed coat and fruit wall is fused known as caryopsis present in

(a) Wheat (b) Sunflower
(c) Mango (d) Tomato

BCECE-2008

Ans. (a) : The pericarp is closely fused with seed coat. Caryopsis is very small, dry and one - seeded fruit. It is also known as grains or cereals.

692. Perisperm is the

(a) remains of nucellus
(b) outer part of embryo sac
(c) degenerated synergid
(d) degenerated secondary nucleus

Haryana PMT-2011

Ans. (a) : Nutritive tissue of a seed derived from the nucellus and deposited external to the embryo sac distinguished from endosperm.
In some seeds such as black pepper and beet, reminants of nucellus are persistent. This residual, persistent nucellus is the perisperm.

693. Scutellum of maize is called

(a) coleorhiza (b) cotyledon
(c) coleoptile (d) hypocotyls

Haryana PMT-2011

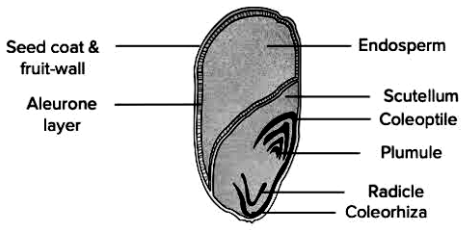
Ans. (b) : Embryos of monocotyledons possess only one cotyledon. In the grass family the cotyledon is called scutellum that is situated towards one side (lateral) of the embryonal axis. At its lower end, the embryonal axis has the radical and root cap enclosed in an undifferentiated sheath called coleorhizae. The portion of the embryonic axis about the level of attachment of scutellum is the epicotyls. Epicotyls has a shoot apex and a few leaf primordial enclosed in a hollow foliar structure, the coleoptiles.

694. Cotyledon of maize grain is called

(a) scutellum (b) plumule
(c) coleorhiza (d) coleoptile

NEET-2016 Phase-I

Ans. (a) : Cotyledon of maize grain is called **scutellum.** In maize grain, the embryo is small and situated in a groove at one end of the endosperm. It consists of one large and shield shaped cotyledon known as scutellum and a short axis with a plumule and radicle. The radicle lies towards, the pointed side of the embryonic region of the seed. It is covered by a protective sheath called **coleorhiza.** The plumule is located towards the upper side of the embryonic region opposite to radicle. It is also enclosed in a protective sheath known as coleoptile.

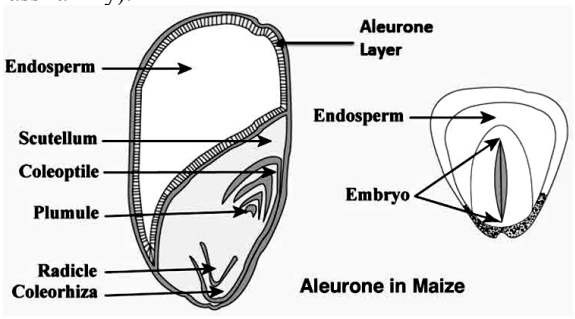


695. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons?

(a) Cotyledon
(b) Endosperm
(c) Aleurone layer
(d) Plumule

AIPMT (Screening)-2010

Ans. (a) : The scutellum is referred to as equivalent to thin cotyledon in monocots (especially members of the grass family).



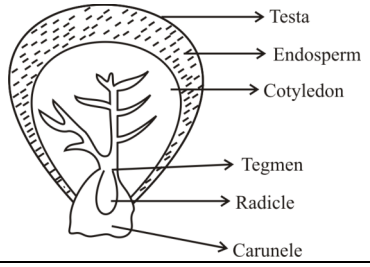
It is very thin with high surface area and serves to absorb nutrients from the endosperm during germination.
Endosperm- endosperm is a tissue produced inside the seeds of the flowering plants following double fertilization. It is triploid in most species.

696. An example of a seed with endosperm, perisperm and caruncle is -

(a) Castor (b) Cotton
(c) Coffee (d) Lily

AIPMT-2009

Ans. (a) : In castor (*Ricinus communis*, family:- Euphorbiaceae) seeds testa and tegmen are united together. They possess, endosperm which acts as the food storage tissue for the seed. They also possess perisperm and caruncle. It is a white spongy bilobed outgrowth present near the narrow end of the seed.



697. The plant whose seeds are known to live the longest viability period is

(a) Carica papaya (b) Triticum aestivum
(c) Zizyphus mauritiana (d) Nelumbo nucifera

JIPMER-2015

Ans. (d) : Viability of Seeds : The ability of seeds to retain their germination power for some time is called viability. It is maximum in lotus *(Nelumbo nucifera),* under favorable conditions, the seeds of this aquatic perennial can remain viable for many years.

698. By which action a seed coat becomes permeable to water:

(a) Scarification (b) Stratification
(c) Vernalization (d) All of the above

AIPMT-2000

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Ans. (a) : Scarification is a pretreatment of seeds that aims to break seed dormancy and accelerate the occurence of uniform seed germination.

• **Scarification** involves weakening, opening or altering the coat of a seed to encourage the germination. It can be done mechanically, thermally and chemically. This will make the seed coat permeable for water and air, which will help in germination of seed.

• The process by which plants use a prolonged cold period-winter-to promote flowering is known as vernalization.

Somewhere, all these processes are used to break the dormancy the seeds naturally as well as artificially.

699. Albuminous seeds store their reserve food mainly in

(a) Perisperm (b) Endosperm
(c) Cotyledons (d) Hypocotyl

NEET (Karnataka)-2013

Ans. (b) : In some seeds, the endosperm persists in the seed as food storage tissue. Such seeds are called endospermic or albuminous.

eg. castor, maize, wheat, barley, rubber, coconut.

700. The viability of seeds is tested by

(a) Safranine
(b) 2, 6 dichlorophenol indophenols
(c) 2, 3, 5 triphenyl tetrazolium chloride
(d) DMSO

NEET (Karnataka)-2013

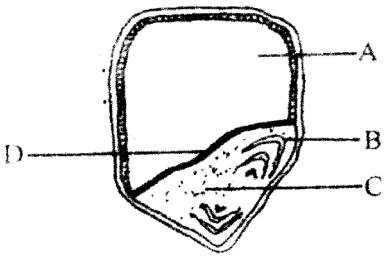
Ans. (c) : Viability of seeds can be known by two methods:

(i) Ability to germinate.
(ii) Testing their ability to respire.

All viable seeds respire. This can be tested by immersing a section of seed containing the embryo in 0.1% solution of triphenyl tetrazolium chloride.

- The viable embryo will turn pink due to conversion of colourless triphenyl tetrazolium chloride into insoluble coloured dye called triphenyl formazan due to reduction.

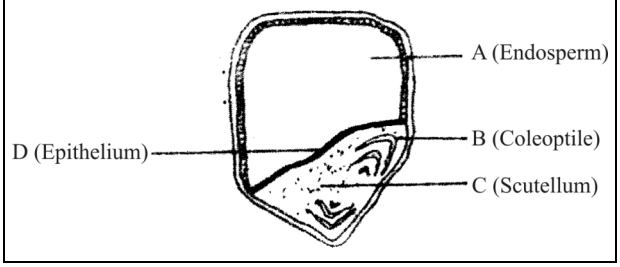
701. The diagram of the section of a maize grain is given below. Identify the parts labelled A, B, C and D.



(a) A - Cotyledon, B - Coleoptile, C - Scutellum, D - Epithelium
(b) A - Endosperm, B - Coleoptile, C - Scutellum, D - Epithelium
(c) A - Endosperm, B - Coleorrhiza, C - Scutellum, D - Epithelium
(d) A - Endosperm, B - Coleoptile, C - Scutellum, D - Alcurone layer

Karnataka CET-2009

Ans. (b)



702. Aleurone layer is found in

(a) embryo (b) nucellus
(c) endosperm (d) endodermis

UP CPMT-2005

Ans. (c): The periphery of the endosperm of many plant species forms an epidermis like layer called the **aleuronic**. During germination, the aleuronic performs an important digestive function secreting hydrolases to break down the starch and proteins stored in the starchy endosperm cells.

703. Aleurone grains are rich in

(a) fat (b) protein
(c) carbohydrates (d) auxins

JIPMER-2014

Ans. (b) : The aleurone grain is specially rich in proteins. Aleurone is taken from the greek word aleuron which means flour. These proteins are present in the protein granules of maturing seed and tubers.

704. Which of the following plant parts can respire even in the absence of oxygen?

(a) Seeds (b) Roots
(c) Stems (d) Leaves

Karnataka CET-2006

Ans. (a) : Seeds can respire even in the absence of oxygen, because seed coats are very tough barriers, to protect the seed from extreme conditions. Seed germination is large energy-driven process. So to compensate for lack of oxygen, germinating seeds adopts anaerobic respiration.

L. Plant Family

705. Lady finger belongs to family

(a) Malvaceae (b) Cucurbitaceae
(c) Liliaceae (d) Brassicaceae

CMC Vellore-2009,2012
JIPMER-2010
Rajasthan PMT-2008,2009
Punjab MET-2009
UP CPMT-2008,2009
BHU PMT(Screening)-2005

Ans. (a) : Lady finger *(Abelmoschus esculentus)* belongs to family Malvaceae. Lady finger is also known as Ochra or Okra.

• In malvaceae family near about 829 genera and 1500 species found in tropical and subtropical areas.

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706. Pencils are prepared from the wood of:

(a) Pinus vinartex
(b) Juniperus virginiana
(c) Chamaecyparis pisifera
(d) Abies pindrow

Haryana PMT-2005
JIPMER-2005
BHU PMT-2003

Ans. (b) : *Juniperus virginiana* wood is used for preparing pencils. It also known as red cedar, eastern red cedar.

• Chamaecyparis commonly called cypress or false cypress. It is used as a material of building palaces, temples, shrines etc.

707. Identify the floral formula of plant belonging to potato family.

(a) ♀ $K_{(5)}, C_5, A_{(9)+1}, G_1$

(b) ⊕ ♀ $K_{(5)}\ \overset{\frown}{C_{(5)}}\ A_5\ \underline{G}_{(2)}$

(c) ♀, $K_{(10)}, C_{10}, A_{10}, G_{(2)}$

(d) ♂, $P_{3+3}, A_{3+3}, G_{(3)}$

Karnataka CET-20.05.2023

Ans. (b) : The floral formula of plants belonging to solanaceae family like potato, tomato. etc. are,

⊕ ♀ $K_{(5)}\ \overset{\frown}{C_{(5)}}\ A_5\ \underline{G}_{(2)}$

(1) Flower : Bisexual and actinomorphic.
(2) Calyx : Five sepals, united, persistent.
(3) Corolla : petal five, united, valvet aestivation.
(4) Androecium : Stamens five, epipetalous.
(5) Gynoecium : Bicarpellary, syncarpous, ovary superior, bilocular.

708. Bi- collateral vascular bundles can be found in these plants

A - Smilax zeylanica
B - Lilium candidum
C - Lycopersicon esculentum
D - Withania somnifera

(a) A , C (b) B, D
(c) C, D (d) B, C

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : Bicollateral vascular bandles are found in stem of Solanaceae family.
Example-
(C) Cherry tomato → *Lycopersicum esculentum*.
(D) Ashwagandha → *Withania somnifera*.
Other examples-
Potato → *Solanum tuberosum*
Chilli → *Capsicum frutescens*
Tobacco → *Nicotiana*

709. Find the correct matching

(A)	**Carrot**	**:**	**Flowers appear from the same point of peduncle**
(B)	**Cocos**	**:**	**Flowers protected by the modified bract**
(C)	**Achyranthes**	**:**	**Flowers appear in the varied lengths of pedicels**
(D)	**Cassia**	**:**	**Flowers appear on the flattened peduncle.**

(a) A C (b) A D
(c) B C (d) A B

AP EAPCET-22.05.2023, Shift-I

Ans. (d) :
• Carrot → Flowers appear from the same point of peduncle
• Cocos → Flowers protected by the modified bract

710. Match the following:

Column-I		Column -II		Column -III	
A.	Opioids	M.	Opium poppy	I.	Receptors are present in CNS and GI tract.
B.	Cannabinoids	N.	Cannabis sativa	II.	Abused by sports persons
C.	Cocaine	O.	South American Plant	III.	Crack
D.	Heroin	P.	Diacetyl morphine	IV.	Smack

(a) A-M-I B-N-II C-O-III D-P-IV
(b) A-P-IV B-O-III C-N-II D-M-I
(c) A-N-II B-O-III C-P-IV D-M-I
(d) A-O-III B-P-IV C-M-I D-N-II

AP EAPCET-23.05.2023, Shift-II

Ans. (a) :
• Opioids → Opium poppy → Receptors are present in CNS and GI tract
• Cannabinoids → Cannabis sativa → Abused by sports persons
• Cocaine → South American Plant → Crack
• Heroin → Diacetyl morphine → Smack

711. The drugs that cause sleeplessness

(a) LSD (b) Barbiturates
(c) Amphetamines (d) Benzodiazepines

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : Amphetamines cause sleeplessness. Amphetamines are the stimulant drugs. They make the messages between our brain and body move fast. Some people use amphetamines to help them stay awake on the job, driving or to study for exam.

712. Bicollateral vascular bundles are found in

I. Roots of solanaceae members
II. Stems of solanaceae members
III. Leaves of solanaceae members
IV. Stems of liliaceae members

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(a) I, II, III only (b) II and IV only
(c) II only (d) I, II, III, IV

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : Bicollateral vascular bandles are found in stem of Solanacea members/family. It have phloem on both side which means xylem bundles are sandwiched between phloems.
Plants blonging to this family are tomato, brinjal, potato, spices (chilli), tobacco, petunia, belladonna and ashwagandha.

713. Carpels and Stamens are in 1 : 2 ratio in the following family
(a) Brassicaceae (b) Solanaceae
(c) Fabaceae (d) Liliaceae

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : Liliaceae-commonly known as lily family. It is monocotylendonous plant. Flower of lily family are bisexual and actinomorphic. It have 3 carpels and 6 stamens. So carpels and stamens ratio are in 1:2.

714. In which of the following sets of families, the pollen grains are viable for months?
(a) Rosaceae, Liliaceae and Poaceae
(b) Leguminasae, Solanaceae and Rosaceae
(c) Solanaceae, Poaceae and Lillaceae
(d) Brassicaceae, Liliaceae and Poaceae

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Pollen is a powdery substances produced by flowers of seed plants. It consists of pollen grains, which produce male gametes.
• Pollen viability refers to the ability of pollen to perform its function of deriving male gametes to the embryo sac.
• Pollen viability varies between minutes and years and which primarily depends on abiotic environmental conditions.
• Pollen with a medium life span (approximately 1-3 months). Example Leguminosae, solanaceae, Rosaceae etc.

715. ——— is used as green manure
(a) *Crotalaria juncea*
(b) Azolla
(c) *Azadiracta indica*
(d) *Hevea brassiliansis*

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : *Crotalaria Juncea* known as sun or sun hemp is a tropical Asian plant of the legume family (Fabaceae). It is a green manure crop because it supplies organic matter and additional nitrogen and these are the feature of a green manure crop.

716. Identify the plants having Apocarpous and Syncarpous ovary respectively
(a) Hibiscus, papaver (b) Hibiscus, Annona
(c) Annona,n Michelia (d) Michelia, Papaver

AP EAMCET-12.07.2022 Shift-II

Ans. (d) : Papaver → Syncarpus ovary
Michelia→ Apocarpous ovary
Annona (Custard apple) → Apocarpous ovary
Hibiscus → Syncarpous ovary

717. Which of the following statement is correct with respect to Solanaceae ?
(A) Gamosepalous and persistent calyx.
(B) Epipetalous stamens alternating with the petals.
(C) Free petals in valvate or twisted aestivation
(D) Bicarpellary, syncarpous and bilocular ovary with parietal placentation.
(a) A, B only (b) A, C only
(c) A, D only (d) B, C only

TS EAMCET-30.07.2022 Shift-II

Ans. (a) : Solanaceae family is also called 'potato family.' It is gamosepalous and persistent calyx.
• Epipetalous stamens alternating with the petals.
• Five petals, gamopetalous, valvate aestivation.
• Bicarpellary, syncarpous and bilocular ovary with axile placentation.
Ex. : Potato, Tomato, Atropa, Chilli etc.

718. Which parts of a flower represents the symbols (C), $\underline{G}$ and $\overline{G}$ respectively
(a) Polygamous corolla, inferior ovary and superior ovary
(b) Gamopetalous corolla, superior ovary and inferior ovary
(c) Gamosepalous calyx, inferior ovary, superior ovary
(d) Gamosepalous calyx, superior ovary, inferior ovary

TS EAMCET-30.07.2022 Shift-II

Ans. (b) :
(C) → Gamopetalous corolla
$\underline{G}$ → Superior ovary
$\overline{G}$ → Inferior ovary
A → Androecium
K → Calyx
K_n → Polysepalous calyx
$K_{(n)}$ → Gamosepalous calyx

719. Choose the correct one related to Arachis
(I) Indehiscent (II) Monadelphy
(III) Non-endospermic Seed (IV) Geocarpy
(V) Dehiscent fruit
(a) I, IV only (b) II, IV, V
(c) I, II, V (d) I, II, III, IV

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : *Arachis hypogaea* also known as peanut, groundnut is the source of peanut oil.
• Monadelphy
• Geocarpy
• Indehiscent fruit
• Non-endospermic seed

720. Plant that produces both chasmogamous and cleistogamous flowers is
(a) Oxalis (b) Vallisneria
(c) Zostera (d) Gloriosa

AP EAMCET-11.07.2022 Shift-II

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Ans. (a) : Some plants produce both chasmogamous and Cleistogamous flowers. These plant are self pollinated plants and do not depend on other plants for pollination. Cleistogamous flowers do not open at all.
Example:- Viola, Oxalis, Commelina etc.

721. Some plants of the following family have swollen leaf base
(a) Leguminosae (b) Asteraceae
(c) Malvaceae (d) Lilliaceae

AP EAMCET-11.07.2022 Shift-II

Ans. (a) : Plants of Leguminosae family have swollen leaf base. A swollen leaf base is also called pulvinus. This swelling occurs due to the change in the turgor pressure. The pulvinus protects the young auxiliary bud.

722. Choose the incorrect statement
(a) Leaves are absent in Taeniophyllum
(b) In Fabaceae root nodules N_2
(c) In onion stem is not fleshy
(d) In potato root tips bulge into tubers

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : Potato tubers are modified stems. They bear, internodes, nodes and axillary buds and used as food.

723. Identify the correct sequence of plants showing the characters given below.
(A) Sunken stomata
(B) Poorly developed mechanical tissue
(C) Plants with mucilage
Options:
(a) Casuarina, Hydrilla, Aloe
(b) Tribulus, Aloe, Hydrilla
(c) Aloe, Tribulus, Hydrilla
(d) Casuarina, Aloe, Opuntia

TS EAMCET-30.07.2022 Shift-I

Ans. (a) :
(A) Sunken stomata :- These stomata are commonly found in plants in arid environments as one of their adaptations to preserve water.
Example :- Casuarina
(B) Poorly developed mechanical tissue:- Mechanical tissues are poorly developed or absent in floating or submerged hydrophytes.
Example:- Hydrilla
(C) Plant with mucilage:- *Aloe vera* contains approximately 98.5% water while the mucilage or gel consists of about 99.5% water.

724. Match the following:

List-I	List-II
(A) Valvate corolla	**(I) Gulmohr**
(B) Funnel shaped corolla	**(II) Vexillary**
(C) Papilionaceous flower	**(III) Calotropis**
(D) Imbricate aestivation	**(IV) Datura**

The correct match is
Options:

	A	B	C	D
(a)	III	II	IV	I
(b)	III	IV	II	I
(c)	I	IV	II	III
(d)	I	II	IV	III

TS EAMCET-30.07.2022 Shift-I

Ans. (b) : **(A) Valvate Corolla –** The aestivation in corolla (petals) of Calotropis is valvate.
(B) Funnel shaped corolla (Infundibuliform) – Datura and several other members of the convolvulaceae family.
(C) Papilionaceous flower – The posterior large petal is called a standard petal, two lateral ones are called wing petals and two fused inferior ones are called keel petals. This type of arrangement of petals is called vexillary.
(D) Imbricate aestivation – In imbricate aestivation the margins of sepals or petals overlap one another but not in any particular direction as in cassia and gulmohur.

725. Find the correct sequence of arrangement of the flower characters in the floral diagram from the posterior to the centre.
(a) A dot or circle, corolla, calyx, gynoecium and androecium
(b) Bract, calyx, androecium and gynoecium
(c) Bract, corolla, calyx, Number of anther lobes and number of locules in placenta
(d) A dot, a circle, calyx, corolla, placentation and number of stamens

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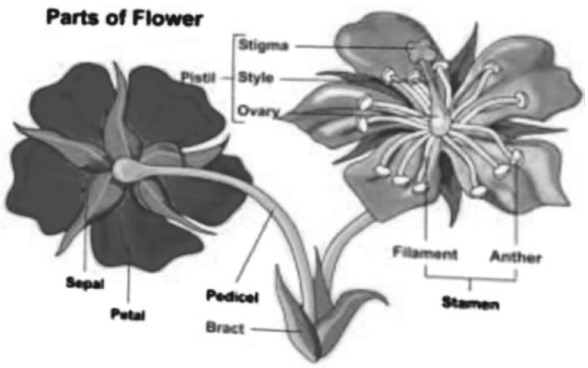
Ans. (b) : Each flower has normally four floral whorls from outside to inside as-

Bract → Calyx → Corolla → Androceium → Gynoecium
↓ ↓ ↓ ↓
whorl of sepals | Whorl of petals | whorl of stamens | whorl of pistil/carpel



726. Identify the plant showing following list of characters.
(A) Tepals
(B) Tendrillar climber
(C) Medicinal value
(D) Hypogynous
(E) Ornamental
Options:
(a) Gloriosa (b) Smilax
(c) Asparagus (d) Colchicums

TS EAMCET-31.07.2022 Shift-I

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Ans. (a) : *Gloriosa superba* is the only species in the autumn - crocus family (colchicaceae)

• The characterstics of this plants are :–

(1) Tepals: - Not clearly differentiated into petals & sepals.

(2) Tendrillar climber:- In glory lily (Gloriosa) leaf tip is changed into a tendril.

(3) Ornamental & Medicinal value:- Climbing lily or glory lilies are grown in green houses or outdoors in the summer & also used for cure arthritis gout, rheumatism, inflammation etc.

(4) Hypogynous:- Hypogynous flowers present in Glory lily.

727. Which of the following statements are correct with respect to the inflorescence in Crotalaria?

A) The peduncle shows an indefinite growth.

B) The peduncle shows a definite growth.

C) The flowers are borne in an acropetal manner on peduncle.

D) The flowers are borne in basipetal manner on peduncle.

Options:

(a) A, D only (b) A, C only

(c) B, C only (d) B, D only

TS EAMCET-31.07.2022 Shift-I

Ans. (b) : Inflorescence in Crotalaria (sunn hemp) family - papilionaceae, the peduncle shows an indefinite growth and the flower are borne in an acropetal manner on peduncle.

728. Plant in which floral buds store food material

(a) Asparagus (b) Agave

(c) Diascorea (d) Onion

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Floral buds of Agave inflorescence are modified into bulbils. These are aerial modified stem that not only store food material but also involve in vegetative reproduction.

729. The inflorescence found in the family Euphorbiaceae with achlamydeous, unisexual flowers is

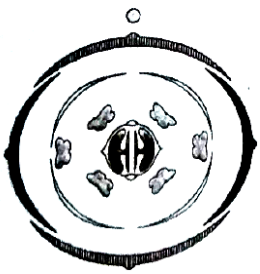
(a) Verticellaster (b) Cyathium

(c) Solitary cyme (d) Hypanthodium

AP EAPCET-11.07.2022 Shift-I

Ans. (b) : The inflorescence found in the family Euphorbiaceae with achlamydeous, unisexual flowers is Cyathium . The existence of achlamydeous flowers which are flowers without a perianth, can be seen in the cyathium inflorescence.

730. The Floral Diagram represents which one of the following families?



(a) Fabaceae (b) Brassicaceae

(c) Solanaceae (d) Liliaceae

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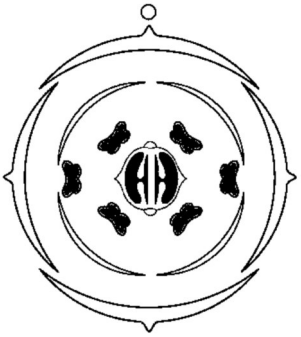
Ans. (b) : The given floral diagram represent the brassicaceae family.

- The floral diagram of a plant family indicates the structure of its flower. It displays the positioning of the ovary, the number, and arrangement of petals and sepals, as well as all the other components of a flower.
- The *Brassica campestris* plant's floral formula is as follows.



Ebr, Ebrl, ⊕ ♂ K_{2+2} C_4 A_{2+4} $\underline{G}_{(2)}$

731. Which of the following statements are correct with respect to Solanaceae?

(A) Gamosepalous and persistent calyx.

(B) Epipetalous stamens alternating with the petals.

(C) Free petals in valvate or twisted aestivation

(D) Bicarpellary, syncarpous and bilocular ovary with parietal placentation

Options:

(a) A, B only (b) A, C only

(c) A, D only (d) B, C only

TS EAMCET-30.07.2022 Shift-II

Ans. (a) : Characterstic features of solanaceae are

1. Gamoseplous :- Sepals are united or fused.

2. Persistent calyx :- Sepals persist even after fruit formation.

3. Aestivation :- Valvate

732. Which type of carpel is observed in Michelia?

(a) Bicarpellary, syncarpous

(b) Multicarpellary, apocarpous

(c) Multicarpellary, syncarpous

(d) Bicarpellary, apocarpous

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Ans. (b) : In Michelia, gynoecium consists of many carpels (multicarpellary) but the carpels are free (apocarpous).

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733. Match the following lists:

List-I	List-II	List-III
A) Atropa	i) Ornament	I) Number and codes
B) Computer usage in taxonomy	ii) Medicine	II) Pterocarpus
C) Gloriosa	iii) Fabaceae	III) Solananceae
D) Odd sepal anterior	iv) Numerical Taxonomy	IV) Rhizome

The correct match is

	A	B	C	D
(a)	ii, III	iv, I	i, IV	iii, II
(b)	ii, IV	iv, II	iii,III	i, I
(c)	iii, IV	i, III	ii, I	iv, II
(d)	I, I	ii, II	iii, IV	iv, III

TS EAMCET-10.08.2021 Shift-I

Ans. (a) : *Atropa belladonna* known as deadly night shade. It is poisonous perennial plant and belongs to Solanaceae family.
(b) Numerical taxonomy is based on all observable character of organism and gives equal important to character.
Number and codes are assigned to few of the selected characters in numerical taxonomy.
(c) Gloriosa is native to much of Africa and Asia. But it is known as an ornamental plant.
Its rhizome is used in treatment of Gout and Infertility
(d) Odd sepal anterior found in Fabaceae.

734. Match the following lists:

List-I	List-II	List-III
A) China Rose	i) Acropetal succession	I) Branched Peduncle
B) Colocasia	ii) Mesocarp is fleshy	II) Hypogynous
C) Panicle	iii) Alternative Phyllotaxy	III) Epigynous
D) Cucumber	iv) Neuter flowers	IV) Corm

The correct match is:

	A	B	C	D
(a)	I, IV	ii, II	iv, I	iii, III
(b)	ii, II	iii, III	I, I	iv, IV
(c)	iii, II	iv, IV	I, I	ii, III
(d)	iii, I	ii, IV	iv, III	I, II

TS EAMCET-10.08.2021 Shift-I

Ans. (c) : Panicle – Panicle has penducle branched and branches have pedicellate flower. It is character of racemose inflorescence. (Acropetal succession)
(a) China rose – Phyllotaxy is a single leaf, present at a node in an alternate pattern. It have actinomorphic hypogynous with twisted aestivation.
(b) Colocasia – Incomplete flower, condition in flower that does not have androecium and gynoecium.
(d) Cucumber – In Epigynous flower the gynoecium occupies is highest position while the other parts are situated below e.g. Cucumber, Guava.

735. In Cucumber the ovary is ————

(a) Absent (b) Epigynous
(c) Hypogynous (d) Perigynous

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : In Epigynous flowers ovary is present inferior to calyx, corolla and andoecium. The margin of thalamus groups upwards enclosing the ovary completely. Other parts of flower arises above the ovary Hence, ovary is said to be inferior. Ex. Guava & Cucumber.

736. Match the following lists.

List-I	List-II	List-III
A. Parthenocarpic fruit	i. Dichasial and Monochasial cyme	I. Avicennia
B. Verticellaster	ii. Roots grow vertically upwards	II. Agave
C. Swampy areas	iii. Dioscoria	III. Banana
D. Storage of food	iv. Sucker	IV. Lamiaceae

The correct match is:

	A	B	C	D
(a)	ii, III	iii, IV	i, II	iv, I
(b)	iv, III	i, IV	ii, I	iii, II
(c)	iv, II	iii, III	ii, IV	i, I
(d)	i, IV	ii, III	iii, II	iv, I

TS EAMCET-09.08.2021 Shift-II

Ans. (b) :

List-I	List-II	List-III
A. Parthenocarpic fruit	(iv) Sucker	III. Banana
B. Verticellaster	(i) Dichasial and monochasial cyme	IV. Lamiaceae
C. Swampy areas	(ii) Roots grow vertically upwards	I. Avicennia
D. Storage of food	(iii) Dioscoria	II. Agava

737. Identify the plants families and arrange the families based on the numerical numbers in ascending order
Phaseolus, Smilax, Dracaena, Colchicum, Cajanus, Withania, Atropa, Datura, Ruscus, Capsicum, Derris, Cesturm

(a) Fabaceae, Solanaceae, Liliaceae
(b) Solanaceae, Fabaceae, Liliaceae
(c) Fabaceae, Liliaceae, Solanaceae
(d) Liliaceae, Fabaceae, Solanaceae

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Ans. (c) : Solanaceae family includes a number of ornamental plants such as Petunia, Lyeianthese, Browalia, and other plants such as *Atropa belladonna* mandray ora and Datura.

The common example of Liliaceae family includes *Allium sativum*, *Allium cepa*, *Astragalus membranaceus*, *Convallaria majolis* and Aloe vera.

The Fabaceae or Leguminosae, economically and medicinally important family of flowering plants.

738. Arrange the below mentioned plants as examples of diadelphous, epiphyllous, and polyadelphous respectively.

(A) Citrus **(B) Lilly**
(C) Pea **(D) Banana**

(a) A, B, C (b) C, B, A
(c) B, C, D (d) D, C, B

TS EAMCET-09.08.2021 Shift-II

Ans. (b) : Diadelphous Condition- In this Condition, filament of Nine different stamens are Connected into one unit and the tenth Posterior stamen remains out of the bundle as a stand part e.g-Pea.

Epiphyllous Condition- when the stamens are attached to the Perianth. Androcium, the male reproductive whorl, is made up of units Called stamens. The perianth is a whorl where the petals and sepals are not differentiated and each unit is called a tepal. e g-Lily.

Polyadelphous Condition- the stamens of a flower are fused by their filaments forming several clusters or groups here the filaments are united while the anthers are free. This condition is seen in citrus. e.g- Lemon.

739. Assertion (A) : Petro plants yield Bio-diesel.
Reason (R) : Jatropa is rich in hydrocarbons.

(a) A is correct but R is wrong.
(b) Both A and R are correct and R is the correct explanation for A.
(c) A is wrong but R is correct.
(d) Both A and R are correct and R is not the correct explanation for A.

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Biodiesel can be made from plant. Jatropha an oil yielding plant that grows well in desert, is rich in hydrocarbons. Hence yield Bio-diesel.

740. Choose the number of modifications in *Allium cepa*.

Tunicated bulb; Reduced stem; adventitious roots; umbel inflorescence; solid leaves; fleshy leaf bases; involucre of bracts

(a) 4 (b) 5
(c) 6 (d) 7

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : A bulb of onion is formed from modified leaves. From the base of bulb roots are comes out called adventitious root. Leaf bases are become fleshy due to storage of food. Inflorescence is compound umbel. Stem is highly reduced and show the tunicated bulb.

741. Identify the plants by their characters respectively.

(i) Axillary buds as tendril, inferior ovary, mesocarp edible
(ii) A lateral branch of one internodal length, swollen petiole
(iii) Funnel shaped corolla, dehiscent fruit
(iv) Basal placentation, condensed peduncle
(A) Helianthus
(B) Eichhornia
(C) Cucumber
(D) Datura

Options:

	A	B	C	D
(a)	i	iii	ii	iv
(b)	iii	ii	i	iv
(c)	i	ii	iii	iv
(d)	iv	ii	i	iii

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : (i) Helianthus : Basal placentation, condensed peduncle. Helianthus is a genus comprising species of annual and perennial flowering plants in the daisy family Asteraceae commonly known as sunflowers.

(ii) Eichhornia : A lateral branch of one internodal length, swollen petiole. Eichhornia, commonly called water hyacinths, was a polyphyletic genus of the aquatic flowering plants family pontederiaceae.

(iii) Cucumber : Axillary buds as tendril, inferior ovary, mesocarp edible.

(iv) Datura : funnel shaped corolla, dehiscent fruit.

742. Match the following Liliaceae members with their common names?

Column–I	Column–II
(A) *Colchicum autumnale*	**(i) Spanish dagger**
(B) *Dracaena augustifolia*	**(ii) Sarsaparilla**
(C) *Yucca gloriosa*	**(iii) Medow saffron**
(D) *Smilax zeylanica*	**(iii) Red dragon**

Options:

(a) (A–i), (B–ii), (C–iii), (D–iv)
(b) (A–ii), (B–iii), (C–i), (D–iv)
(c) (A–iii), (B–iv), (C–i), (D–ii)
(d) (A–iii), (B–i), (C–ii), (D–iv)

AP EAPCET-07.09.2021 Shift-I

Ans. (c) :

Column – I		Column - II
A.	*Colchicum autumnale*	Medow saffron
B.	*Dracaena augustifolia*	Red dragon
C.	*Yucca gloriosa*	Spanish dagger.
D.	*Smilax zeylanica*	Sarsaparilla

743. The pulvinate leaf base is present in _____

(a) *Gloriosa superba* (b) *Glycine max*
(c) *Allium cepa* (d) *Solanum tuberosum*

AP EAMCET-05.10.2021 Shift-I

Ans. (b) : The pulvinate leaf base is present in *Glycine max*. In *Glycine max* the leaves are compound and are alternate. There is one leaf per node along the stem. The edge of the leaf blade is entire in *Glycine max* (Soyabean).

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744. A distinct monocot character shown by the flowers of Liliaceae is _____

(a) Hypogynous flowers
(b) Actinomorphic flowers
(c) Trimerous flowers
(d) Bisexual flowers

AP EAMCET-05.10.2021 Shift-I

Ans. (c) : Trimerous flowers are organized in threes, having parts in numbers that are multiples of three.
• The monocots typically have trimerous flowers shown by the flower of Liliaceae.

745. Match Column-I with Column-II

	Column-I		Column-II
(A)	$\%\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$	(i)	Brassicaceae
(B)	$\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{(5)}\overset{\frown}{C_{(5)}A_5}\underline{G}_2$	(ii)	Liliaceae
(C)	$\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}\overset{\frown}{P_{(3+3)}A_{3+3}}\underline{G}_{(3)}$	(iii)	Fabaceae
(D)	$\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{2+2}C_4A_{2-4}\underline{G}_{(2)}$	(iv)	Solanaceae

Select the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(iv)	(ii)	(i)	(iii)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(i)	(ii)	(iii)	(iv)
(d)	(ii)	(iii)	(iv)	(i)

NEET-2021

Ans. (b) :

(A) $\%\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$ - Fabaceae

(B) $\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{(5)}\overset{\frown}{C_{(5)}A_5}\underline{G}_2$ - Solanaceae

(C) $\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}\overset{\frown}{P_{(3+3)}A_{3+3}}\underline{G}_{(3)}$ - Liliaceae

(D) $\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}K_{2+2}C_4A_{2-4}\underline{G}_{(2)}$ - Brassicaceae

746. In some members of which of the following pairs of families, pollen grains retain their viability for months after release?

(a) Rosaceae ; Leguminosae
(b) Poaceae ; Rosaceae
(c) Poaceae ; Leguminosae
(d) Poaceae ; Solanaceae

NEET-2021

Ans. (a) : Pollen grains in some rosaceae, Leguminosae and Solanaceae families can survive up to a month.
• Pollen viability is the ability to develop into seed and fruit. Rosaceae, leguminosae and solanaceae family plants remains viable for a month due to sporopollenin.

747. Which one of the following plants is an invasive species that has spread to many parts of the Indian subcontinent?

(a) *Prosopis juliflora* (b) *Ficus religiosa*
(c) *Cocos nucifera* (d) *Lotus corniculatus*

KVPY (SA)-2021

Ans. (a) : *Prosopis juliflora* plants is an invasive species that has spread to many parts of the Indian subcontinent.
Prosopis juliflora is a theory shrub 3.5m or tree growing up to 15m height. It is a shrub or small tree in the family fabaceae. It has a thick rough grey-green bark that becomes caly with age.

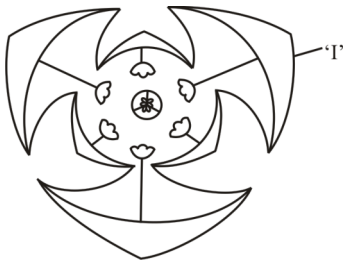
748. The differences between parents and offspring, among offsprings of the same parents and individuals of the same species are called _____.

(a) heredity (b) allelism
(c) variations (d) homology

MHT CET-06.10.2020 Shift-I

Ans. (c) : The differences between parents and offspring. Among offsprings of the same parents and individuals of the same species are called variations. There variations are mainly caused due to crossing over of meiosis which brings shuffling of genetic material.

749. Identify the floral unit 'I' in the given floral diagram.



(a) Sepal (b) Petal
(c) Tepal (d) Perianth

Karnataka CET-2020

Ans. (c) : This floral diagram belong to Liliaceae family. Sepal and petal are fused to each other and they form perianth (tepals). Ovary tricarpellary, syncarpous, superior with axil placentation.

Floral formula : $\oplus\overset{\nearrow}{\underset{+}{\text{Ø}}}\overset{\frown}{P_{3+3}A_{3+3}}\underline{G}_{(3)}$

750. Match the following :

Name of the Plant	Fruit	Family
A. Tomato	i. Moraceae	p. Rosaceae
B. Apple	ii. Caryopsis	q. Solanceae
C. Rice	iii. Berry	r. Poaceae
D. Jack	iv. Pome	s. Sorosis

(a) (A–iii–p), (B–ii–s), (C–i–q), (D–iv–r)
(b) (A–iii–q), (B –iv–p), (C–ii–r), (D–i–s)
(c) (A–i–p), (B–ii–q), (C–iii–r), (D–iv–s)
(d) A–ii–p), (B–iii–q), (C–iv–r), (D–i–r)

AP EAMCET-24.09.2020 Shift-II

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Ans. (b) : (A). Tomato – Tomato is a simple fleshy fruit of Berry type.
Solanum lycopersicum (Tomato) belongs to family - **Solanaceae.**
(B) Apple – An apple is a Pome fruit belongs to family – Rosaceae.
(C) Rice – Rice is caryopsis fruit type belongs to family- Poaceae (Gramineae)
(D) Jack fruit – The fruit in Jack fruit is produced from a spadix inflorescence and thus is called sorosis.
• *Artocarpus heterophyllus* (Jack fruit) belongs to family – Moraceae.

751. Match the following lists:

List I	List II
(A) Sessile, unisexual and neuter flowers arranged in acropetal succession	**(I) Euphorbiaceae**
(B) All the flowers are brought to the same height due to varied length of pedicle	**(II) Jasmine**
(C) Achlamydeous stalked, unisexual flowers arranged in a cup like structure	**(III) Cocos**
(D) A three flower cymose inflorescence	**(IV) Cauliflower**

The correct match is

	A	B	C	D
(a)	III	I	II	IV
(b)	III	IV	I	II
(c)	III	II	I	IV
(d)	IV	III	II	I

TS EAMCET-29.09.2020 Shift-II

Ans. (b) :
Cocos :- Sessile, unisexual and neuter flowers arranged in acropetal succession.
Euphorbiaceae:- Achlamydeous, stalked, unisexual flowers arranged in a cup like structure.
Jasmine:- A three flower cymose inflorescence.
Cauliflower:- All the flower are brought to the same height due to varied length of pedicle.

752. Identify the plants with the following characters respectively.
(I) Herb, pulvinate leaf base, zygomorphic, monodelphous, protandrous.
(II) Herb, hairy stem, exstipulate, axillary inflorescence, persistent calyx, protogynous.
(III) Radical leaves, hypogynous, basifixed anthers, axile placentation, protandrous, polyembryony.

(A) Solanum **(B) Allium**
(C) Datura **(D) Arachis**
(E) Crotalaria **(F) Asparagus**

	I	II	III
(a)	E	A	F
(b)	D	C	F
(c)	E	C	F
(d)	D	A	B

TS EAMCET-29.09.2020 Shift-II

Ans. (d) :
(A) Solanum :- Herb, hairy stem, exstipulate axillary inflorescence, persistent calyx, protogynous.
(B) Allium (onion) :- Radical leaves, hypogynous, basifixed anthers, axile placentation, protandrous, polyembryony.
(C) Arachis (Peanut) :- Herb, pulvinate leaf base, zygomorphic, monodelphous, protandrous.

753. 'Colchicine', a mutagen is extracted from which plant?
(a) Bulb bearing Liliaceae plant
(b) Rhizome bearing Liliaceae plant
(c) Corm bearing Liliaceae plant
(d) Cladophyll bearing Liliaceae plant

TS EAMCET-29.09.2020 Shift-II

Ans. (c) : *Colchicum autumnale* , commonly known as *Autumn crocus*, meadow saffron is toxic autumn - blooming flowering plant belong to family colchicaceae.
• The bulb - like corms of *Colchicum autumnale* contain colchicines, a useful drug & it is also used in plant breeding.

754 $\oplus \text{⚥} K_{(5)} \overset{\frown}{C_{(5)} A_{(5)}} \underline{G}_{(2)}$

The above floral formula represents ___
(a) Liliaceae (b) Asteraceae
(c) Fabaceae (d) Solanaceae

AP EAMCET-25.09.2020 Shift-I

Ans. (d) :
$\oplus \text{⚥} K_{(5)} \overset{\frown}{C_{(5)} A_{(5)}} \underline{G}_{(2)}$

The above floral formula represented family solanaceae.
• Inflorescence: Typically cymose type.
• **Flower:-** Ebracteate, actinomorphic, bisexual pentamerous & hypogynous
• **Calyx:-** Five sepals, Gamosepalous.
• **Corolla:-** Gamopetalous, 5 - petals.
• **Androecium:-** 5 in number, polyandrous & epipetalous on the corolla.
• **Gynoecium:-** Bicarpellary syncarpous,superior ovary & Bilocular, oblique swallen placenta
• **Placentation:-** Axile placentation

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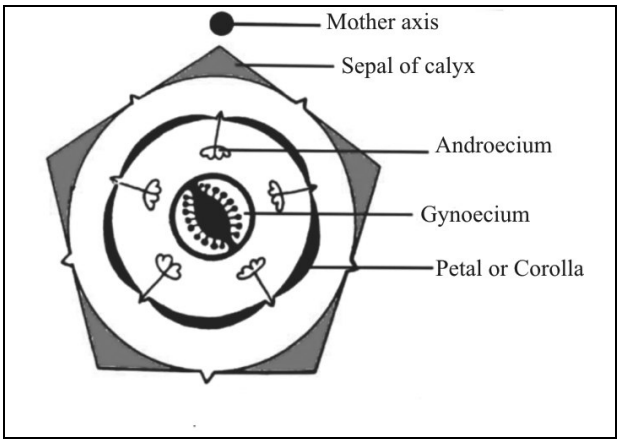

755. Correct position of floral parts over thalamus in mustard plant is,

(a) Gynoecium is situated in the centre, and other parts of the flower are located at the rim of the thalamus, at the same level.
(b) Gynoecium occupies the highest position, while the other parts are situated below it.
(c) Margin of the thalamus grows upward, enclosing the ovary completely, and other parts arise below the ovary.
(d) Gynoecium is present in the centre and other parts cover it partially.

NEET-2020 Phase-II

Ans. (b) : Gynoecium occupies the highest position, while the other parts are situated below it. The gynoecium contains the highest position over the other floral parts. The ovary is said to be superior.

756. Which of the following is the correct floral formula of Liliaceae?

(a) ⊕ ⚥ $K_{(5)}\ \overset{\frown}{C_{(5)}\ A_5}\ \underline{G}_{(2)}$

(b) % ⚥ $C_{1+2+(2)}\ A_{(9)+1}\ \underline{G}_1$

(c) ⊕ ♂ ♀ $K_{(5)}\ \overset{\frown}{C_{(5)}\ A_5}\ \underline{G}_{(2)}$

(d) Br ⊕ ⚥ $\overset{\frown}{P_{(3+3)}\ A_{3+3}}\ G_{(3)}$

NEET-2020 Phase-II
TS EAMCET-08.05.2019 Shift-II

Ans. (d) : The floral pattern in liliaceae is as follows-

- **'Br'** represent bracteate condition
- **'⊕'** represent actinomorphic condition
- ⚥ represent bisexual condition.
- **Perianth:-** Six, in two whorls, gamophyllous, inferior.
- **Androecium:-** Six, in two whorls, polyandrous, epiphyllous,
- **Gynoecium:-** Tricarpellary, Syncarpous, ovary is superior, ovules are numerous, axile placentation, style is simple, stigma is three lobed.

757. Which of the following is called the "Terror of Bengal'?

(a) Carrot grass
(b) Lantana
(c) Bloom-forming algae
(d) Water hyacinth

GUJCET-2020

Ans. (d) : Water hyacinth (*Eichhornia crassipes*). It is also known as the "Terror of Bengal" because it is an exotic shrub which is growing at an alarming rate on the surface of water body. Water hyacinth is accuring in tropical and subtropical South America or native to the Amazon basin. It is known as one of the fastest growing plants.

758. In Salvia and Cestrum, the pollination is achieved with help of ____

(a) insects (b) wind
(c) bats (d) birds

MHT CET-08.10.2020 Shift-I

Ans. (a) : The pollination of Salvia is dependent on insect and *Cestrum nocturnum* (night blooming jasmine) is also pollinated by insect.

759. Which of the following are the characteristic features of the family Fabaceae?
I. Gamosepalous nature
II. Stamens five, epipetalous
III. Marginal placentation
IV. Petals five, polypetalous
V. Fruit is a berry
The correct answer is

(a) I, II, III,V (b) II, III, IV,V
(c) I, II,III, IV (d) I, III, IV

TS EAMCET-08.05.2019 Shift-II

Ans. (d) : Features of family Fabaceae are –
Flower : Bisexual, zygomorphic, Pentamerous & hypogynous.
Calyx : Five sepals, gamosepalous (united)
Corolla : Five petals, one posteriorly placed, two lateral called wings & two anterior enclosing stamens and pistil which is known as keel, polypetalous.
Androecium : Ten stamens, diadelphous.
Gynoecium : Monocarpellary with superior and unilocular ovary.
Fruit : Legume.
Placentation : Marginal

760. Match the following lists :

List –I		List-II	
A	Musa, Cocos, Colocasia	I	Corymb
B	Crotalaria, Mangifera	II	Spikes
C	Cassia, Cauliflower	III	Umbel
D	Achyranthes, Grasses	IV	Spadix
		V	Raceme

The correct match is:

	A	B	C	D
(a)	V	IV	III	II
(b)	IV	III	II	I
(c)	IV	V	I	II
(d)	II	III	V	I

TS EAMCET-08.05.2019 Shift-II

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Ans. (c) :

	Plants	Inflorescence
A.	Musa, Cocos, Colocasia	Spadix
B.	Crotalaria, Mangifera	Raceme
C.	Cassia, Cauliflower	Corymb
D.	Achyranthes, Grasses	Spikes

761. Choose the correct set of plants showing the following features

(A) Medicinally important plant and a tendrillar climber with unisexual flowers

(B) Spice yielding plant with cymose inflorescence, persistant calyx, unilocular ovary

(C) Oil seed plant with monoadelphous stamens, unilocular ovary and indehiscent pod

Options :

(a) Ruscus, Capsicum, Denis
(b) Smilax, Solaman, Arachis
(c) Asparagus, Capsicum, Arachis
(d) Smilax, Capsicum, Arachis

AP EAMCET-24.04.2019 Shift-I

Ans. (d) : ***Smilax Zeylanica*** **–** Its roots & leaves are used for medicinal purposes. Its flowers are unisexual & greenish in colour. It is a climbing shrubs with prickly stem.

Capsicum – Some of the member of capsicum are used as spices, vegetables & medicines.

• **Arachis –** Peanut (*Arachis hypogaea*) is one of the major crops and is the fifth largest source of plant oil in the world.

• In floral characterstics the stamens are monoadelphous & monocarpellary with a superior or inferior unilocular ovary.

762. Which of the following is a source of anthocyanin?

(a) Daucus carota
(b) Catharanthus roseus
(c) Mentha piperita
(d) Datura stramonium

MHT CET-2019

Ans. (a) : *Daucus carota* (carrot) is the most important root vegetable plant which contains anthocyanins. Anthocyanins are a class of water soluble flavonoids widely present in fruits and vegetables.

763. Match the following

List-I	List-II	List-III
(A) Radical leaves	(i) Anterior odd sepal	(I) Protandrous
(B) Exstipulate leaf	(ii) Artificial System of classification	(II) Persistant Calyx
(C) Monocarpellary unilocular gynoecium	(iii) Allium	(III) Geocarpy
(D) plantarum	(iv) Solid or hollow stem	(IV) Linnaeus

The correct answer is

Options:

	A	B	C	D
(a)	iii, I	iv, II	i, III	ii, IV
(b)	iv, I	iii, II	i, III	ii, IV
(c)	iii, II	iv, III	i, I	ii, IV
(d)	iii, I	iv, III	i, II	ii, IV

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : ***Allium cepa*** **(onion)**

Leaf :- A cluster of radical leaves emerges from the underground bulb, cylindrical & fleshy having sheathy leaf base with parallel venation.

Flower:- are protandrous i.e, condition in which male stamens mature before the female carpels.

(b) Solanaceae:-

Leaf:- Leaves are alternate, exstipulate & simple

Calyx:- Five lobed & usually persistent.

(c) Fabaceae :- In fabaceae family monocarpellary unilocular ovary is present. Anterior odd sepals are also found.

• Geocarpy is an extremely rare means of plant reproduction in this family.

(d) - Artificial system of classification was first used by Linnaeus. The cryptogames were included in flowering plants. Linnaeus system is known as sexual system of classification.

• He outlined an artificial system of classification in his book "species plantarum" in 1753.

764. Match the following:

List-I	List-II	List-III
(A) Acropetal arrangement	(i) dichasial cyme and monochasial cyme	(I) Mangifera
(B) Margin of Thalamus Enclosed the ovary	(ii) Inferior ovary	(II) Cypsella
(C) Single ovule attached to the base of ovary	(iii) Simple raceme	(III) False whorl
(d)Lamiaceae	(iv)Persistant pappus like calyx	(IV) Guava

The correct answer is

Options:

	A	B	C	D
(a)	iii, I	ii, IV	iv, II	i, III
(b)	iii, I	iv, IV	ii, III	i, II
(c)	ii, IV	iii, I	iv, II	i, III
(d)	iv, III	i, II	iii ,II	ii, IV

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : ***Mangifera indica*** **(mango)** :- It contains numerous sessile flowers arranged acropetally and racemose type of infloresence.

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Cypsella :- (Asteraceae-family) curved ovule with the mycropyle almost touching the funiculus. It is a very rare type of ovule.

• Pappus are the modified part of calyx.

Guava :- An epigynous flower is that in which the thalamus is hollow & cup shaped, & completely fused with the lower part of the ovary. The ovary is inferior.

Lamiaceae :- Inflorescence, which begins as a dichasial cyme & ends in a monochasial cyme called thyrsus.

• Verticillaster type of infloresence is called the flase whorl.

765. Read the following statements and identify the correct pairs of plants

(A) modified protective bract and edible pedicel

(B) food storing floral bud and leaf bases

(C) photosynthetic stem and petiole.

Options:

(a) Oryza and Cocos; Aloe and Agave; Nepenthes and Australian acacia

(b) Colocasia and Apple; Diascorea and Opuntia;Australian acacia and Euphorbia

(c) Musa and Ficus; Diascorea and Bryophyllum; Australian acacia and Bouganvillea

(d) Cocas and Anacardium; Agave and Allium; Casuarina and Australian acacia

AP EAMCET-24.04.2019 Shift-II

Ans. (d) : Cocas & Anacardium :- Cashew (*Anacardium occidentale*) fruit, which contains the seed or 'nut' hangs at the end of what is referred to as the cashew ' apple' - the edible swollen fruit stem or pedicel.

• **Agave and Allium:-** Floral buds of Agave are modified into bulbils. These are aerial modified stem that not only store food materials but also involved in vegetative reproduction.

• **Casuarina and Australian Acacia:-** Petiole of Australian Acacia help in photosynthesis. Petiole get modified & becomes flat leaf like and is called phyllode.

766. Identify the correct combination of the plant with the family it belongs to

(a) *Gloriosa superba*-Liliaceae

(b) *Lycopersicon esculentum*-Fabaceae

(c) *Phaseolus mungo*-Solanaceae

(d) *Aloe vera*-Fabaceae

TS EAMCET-08.05.2019 Shift-I

Ans. (a) :

(1) *Gloriosa superba*→Liliaceae

(2) *Lycopersicon esculentum* → Solanaceae

(3) *Phaseolus mungo* → Fabaceae

(4) *Aloe vera* → Asphodelaceae

767. The floral formula Br, Brl, %, ♂, ♀, $K_{(5)}$, $C_{1+2+(2)}$, $A_{(9)+1}$, $\underline{G}_1$ belongs to

(a) *Solanum nigrum*

(b) *Pisum sativum*

(c) *Allium cepa*

(d) *Withania somnifera*

TS EAMCET-08.05.2019 Shift-I

Ans. (b) : *Pisum sativum* (sweet pea)

Br, Brl, %, ♂, ♀, $K_{(5)}$, $C_{1+2+(2)}$, $A_{(9)+1}$, $\underline{G}_1$

1 - Inflorescence :- Axillary, terminal raceme.

2-Flower:- Bracteate, Bracteolate, complete, zygomorphic, hermaphrodite, pentamerous & hypogynous or perigynous.

3- Calyx :- Five sepals united, valvate or imbricate aestivation in bud.

4 - Corolla :- Five petals 1 standard, 2 wings, 3 keel which encloses the stamens & carpels.

5 - Androecium :- Ten stamens, diadelphous 9 stamens are united & 1 stamen remains free.

6 - Gynoecium :- Monocarpellary with superior or partially inferior unilocular ovary.

768. Study the following lists :

	List-I		List-II
A.	Triticum	I.	Anacardiaceae
B.	Lycopersicon	II.	Fabaceae
C.	Mangifera	III.	Poaceae
D.	*Glycine max*	IV.	Liliaceae
		V.	Solanaceae

The correct match is

	A	B	C	D
(a)	III	I	V	II
(b)	III	V	I	II
(c)	II	III	IV	I
(d)	IV	V	I	III

TS EAMCET-08.05.2019 Shift-I

Ans. (b) :

A- *Triticum aestivum* (Wheat) → (Poaceae/ Gramineae)

B - Lycopersicon (Tomato) → Solanaceae

C- *Magnifera indica* (Mango) → Anacardiaceae

D - *Glycine max* (soyabean) → Fabaceae

769. King of spices is:

(a) *Brassica nigra* (b) *Piper nigrum*

(c) *Piper longum* (d) *Curcuma longa*

AIIMS-26.05.2019 Shift-II

Ans. (b) : The black pepper (*Piper nigrum*) the king spices called "Black gold". It belongs to the family Piperaceae. It was one of the very first items of commerce between India and Europe. It is one of the world's most traded spices in the world.

• ***Piper longum*** is also known as the long pepper or pipli. It belongs to the family Piperaceae. It is a flowering vine and it cultivated for its fruit.

• ***Brassica nigra*** is also known as the black mustard. It belongs to the family Brassicaceae. The plant is cultivated annually for its black and dark seeds. It is generally grown in North Africa and in the temperate regions of Europe and parts of Asia.

• ***Curcuma longa*** (Turmeric) is a flowering plants and belongs to the family of zingiberaceae.

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770. Match the column I and II

Column I	Column II
(A) Apocarpous	**(i) Papaver**
(B) Syncarpous	**(ii) Michellia**
(C) Epiphyllous	**(iii) Cashew**
(D) Cotyledon	**(iv) Aloe**

(a) A – i, B–ii, C–iii, D –iv
(b) A – ii, B–i, C–iv, D –iii
(c) A – iv, B–iii, C–ii, D –i
(d) A – iv, B–i, C–iii, D –ii

AIIMS-25.05.2019 Shift-II

Ans. (b) :
• **Apocarpous** means a flower, or ovary having distinct carpels that are not joined together.
Ex.- Michellia
• **Syncarpous** means a flower, or ovary in which the multiple carpels are fused into a single structure.
Ex.- Papaver
• **Epiphyllous condition** in which the stamens are fused with tepals as found in the liliaceae family.
• Aloe is a succulent plant which have epiphyllous stamens.
• **Cotyledon** is a part of the embryo within seeds that form the first leaves during seed germination which provide nutrition. Cotyledons stored food. Cashew is a tropical evergreen tree that produces the cashew seed (cotyledons) and the cashew apple.

771. Stamens epipetalous, alternate with the petals, usually not equal in length and filaments are basifixed, in_____.

(a) Solanaceae (b) Malvaceae
(c) Arecaceae (d) Rubiaceae

SRM JEEE-2018

Ans. (a) : Stamens epipetalous alternate with the petals usually not equal in length and filaments are basifixed in Solanaceae family. It has more than 90 genera and nearly 3000 species distributed throughout the world.

772. Find the correct floral form the given floral description

Bracteate, ebracteolate, pentamerous, bisexual, actinomorphic; sepals 5, polysepalous, imbricate aestivation; petals 5, gamopetalous, twisted aestivation, stamens 5, epipetalous; pentacarpellary syncarpus, superior ovary with axile placentation.

Options:

(a) Br, Ebrl, ⊕, ♂ ♀ $K_5\ C_5\ A_5\ \overline{G}_{(5)}$
(b) Br, brl, ⊕, ♂ ♀ $K_5\ C_5\ A_5\ \underline{G}_{(5)}$
(c) Br, brl %, ♂ ♀ $K_5\ C_5\ A_5\ \underline{G}_{(5)}$
(d) Br, Ebrl, ⊕, ♂ ♀ $K_5\ C_{(5)}\ A_5\ \underline{G}_{(5)}$

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : In the given floral description the correct floral form is-
Br, Ebrl, ⊕, ♂ ♀ $K_5\ C_{(5)}\ A_5\ \underline{G}_{(5)}$

773. Roots of the following hydrophytes are fixed to substratum, but their long petiolated leaves keep them floating on water surface
(i) Salvinia
(ii) *Victoria regia*
(iii) Utricularia
(iv) Nymphaea
The correct combination is

(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (i) (d) (ii) and (iv)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : *Victoria regia* - *Victoria amazonica* is the world's largest water Lily and among the largest in the Nymphaeaceae family. The first discovery was in 1801 Bolivia and it is indigenous to the Amozon River basin's shallow waters.
Nymphaea - The numberous species and hybrids of Nymphaea are the most commonly cultivated water lilies.
Salvinia - A genus in the family Salviniaceae, is a floating fern named in honor of Anton Maria Salvini, a 17th century Italian scientist.

774. Smilax possesses the following characters.
(i) Six tepals and six stamens in two whorls, odd tepal of outer whorl is anterior in position and odd tepal of inner whorl is posterior in position, Valvate aestivation.
(ii) Pentacarpellary, ovary inferior, pentalocular with few ovules, stigma bifid and simple.
(iii) Fruit is usually capsule, endospermous seed
(iv) Flower is solitary, bisexual.
The correct answer is

(a) (i), (ii) (iv) and (iii)
(b) (i) and (iii)
(c) (ii) and (iv)
(d) (ii) and (iii)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Smilax posses six tepal and six stamens in two whorl, odd tepal of outer whorl is anterior in position and odd tepal of inner whorl is posterior in position, Valvate aestivation in its floral structure.
• Pentacarpellary, syncarpous, pentalocular, axile placentation, ovary inferior, many ovules per loculus, style distinct, stigma single, terminal.
• A capsule is the most common fruit type. Fruit is usually capsule endospermous seed.
• The inflorescence is a terminal receme of a salitary flower or rarely an umbel. The flowers are bisexual.

775. Match the following lists :

List-I	List-II
(A) The mesocarp and endocarp are fused to form pulp and the seeds are hard	**(i) Pisum**
(B) Stamens are united into one bunch	**(ii) Asparagus**
(C) The main axis continues to grow and flowers are arranged laterally in acropetal succession on the branch of peduncle	**(iii) Crotalaria**

@apna_pdf

(D) Stamens are united into two bundles **(iv) Tobacco**

(v) Capsicum

The correct answer is

	A	B	C	D
(a)	(v)	(iii)	(ii)	(i)
(b)	(iii)	(v)	(iv)	(ii)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(ii)	(i)	(v)	(iii)

TS EAMCET-02.05.2018 Shift-II

Ans. (a) :

	List – I	List - II
a.	The mesocarp and endocarp are fused to form pulp and the seeds are hard	Capsicum
b.	Stamens are united into one bunch	Crotalaria
c.	The main axis continues to grow and flowers are arranged laterally in acropetal succession on the branch of peduncle	Asparagus
d.	Stamens are united into two bundles	Pisum

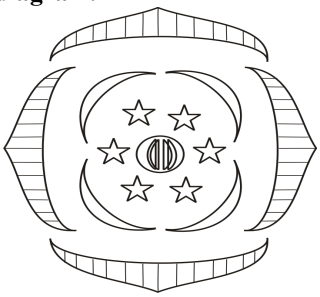
776. In plants growing under environmental stress condition, seeds germinate while they are on the mother plant. An example for such a condition is :

(a) Wolfia (b) Brown alga
(c) Rhizophora (d) Eucalyptus

TS EAMCET-02.05.2018 Shift-II

Ans. (c) : Small genus (the type of the family Rhizophoraceae) of tropical trees and shrubs that have tetramerous flowers and a party inferior ovary forming a fleshy berry. The genus Rhizophora is the most common Mangrove genus worldwide two species.

777. Choose the correct floral formula of the given floral diagram.



(a) $\oplus \overset{\nearrow}{\underset{+}{\bigcirc}} K_{(2+2)}C_4A_{4+2}G_{(3)}$

(b) $\oplus \overset{\nearrow}{\underset{+}{\bigcirc}} K_{(3)+2}\overset{\curvearrowleft}{C_4A_4}G_{(2+1)}$

(c) $\oplus \overset{\nearrow}{\underset{+}{\bigcirc}} K_{2+2}C_{4x}A_{2+4}G_{(2)}$

(d) $\oplus \overset{\nearrow}{\underset{+}{\bigcirc}} K_{2+2}C_4A_{2+4}G_2$

Karnataka CET-2018

Ans. (c) : In Brassicaceae family- Cruciform corolla (4x)/ cross shaped (x) present and stamens shows tetradynamous condition.

• Flowers of brassicaceae family are distinguished by their symmetry and presence of reproductive part.

The floral formula of brassicaceae is

$\oplus \overset{\nearrow}{\underset{+}{\bigcirc}} K_{2+2}C_{4x}A_{2+4}G_{(2)}$

778. Which of the following is a monocarpic plant?

(a) Bambusa (b) Sesamum
(c) Lauandual (d) Pinus

TS EAMCET-02.05.2018 Shift-I
DUMET-2002

Ans. (a) : *Bambusa tulda* is a perrenial plants which is monocarpic and might take several years to bloom.

Some bamboo plants complete their entire life cycle in 50 – 100 year during which they flower only once.

779. The following partial floral formula "Brl.⊕.P G" was derived during identification of a plant. These features indicate that the flower possess

i) Bracteoles
ii) Inferior ovary
iii) Petals
iv) Two equal radial halves when cut in any radial plane following to pass through centre of flower.

The correct answer is

(a) i & ii (b) ii & iii
(c) ii & iv (d) i & iv

TS EAMCET-03.05.2018 Shift-I

Ans. (d) :

"Brl. ⊕.PG"

The features of flower is :-

1. Bracteolate.
2. Actinomorphic
3. Perianth (Calyx + corolla)
4. Superior ovary.

780. Solanaceae family plants are known for

i) Rhizobial association with roots
ii) Production of cigarettes from leaves
iii) Numerous stamens
iv) Seeds are endospermic

The correct combination is

(a) ii & iii (b) iv & i
(c) iv & ii (d) iii & i

TS EAMCET-03.05.2018 Shift-I

Ans. (c) : Tobacco is the common name of Nicotiana belongs to the family Solanaceae are used for production of cigarettes from its leaves. Seeds of solanaceae family are endospermic.

781. The following plants are associated with human health care and Bio- diesel production respectively.

@apna_pdf

(a) Jatropa and Chlorella
(b) Rubber and Pongamia
(c) Chlorella and Arnica
(d) Digitalis and Jatropa

TS EAMCET-03.05.2018 Shift-I

Ans. (d) : ***Digitalis purpurea*** - is used to treat Congestive Heart Failure (CHF) & heart rhythm problem (atrial arrhythmias). It can increase blood flow throughout our body & reduce swelling in our hands and ankles.
Jatropa curcas **-** Its oil has a high cetane rating & low sulfur content both of which are beneficial for biodiesel production.

782. The genus solanum includes the following species.
i) S. melongena ii) S. indica
iii) S. aestivum iv) S. nigrum
The correct answers
(a) i & ii (b) i and iv
(c) ii & iii (d) iii & iv

TS EAMCET-03.05.2018 Shift-I

Ans. (b) : Genus solanum inclucles following species :-
1 - *Solanum nigrum* (makoi)
2 - *Solanum melongena* (Egg plant, Brinjal)
3 - *Solanum tuberosum* (Potato)
4 - *Solanum lycopersicum* (Tomato)

783. Which one of the following in NOT true about Salvia flower?
(a) Flowers are bisexual
(b) Flowers are protandrous
(c) The upper branch of bifurcated connective bears sterile anther lobe and lower branch bears fertile anther lobe
(d) The upper branch of bifurcated connective bears fertile anther lobe and lower branch bears sterile anther lobe

MHT CET-2018

Ans. (c) : One of the anther lobes is sterile (lower branch). And other lobes is fertile (upper branch).
The upper branch of bifurcated connective bears fertile anther lobe and lower branch bears sterile anther lobe.

784. Identify group of plants based on given anatomical characters in sequence,
(A) Bicollateral vascular bundles
(B) Bulliform cells
(C) Ring arrangement of vascular bundles
Answers respectively
(a) Tridax, Nerium, Zea
(b) Helianthus, Grass, Nerium
(c) Nerium, Tridax, Zea
(d) Cucurbita, Zea, Tridax

AP EAMCET-25.04.2018 Shift-I

Ans. (d) : Bicollateral vascular bundle is a type of conjoint vascular bundle where xylem is in between two phloem strands. Example- cucurbita.
Bulliform cells are also known as motor cells, are huge, bubble - shaped epidermal cells found on the top surface of leaves in groups of multiple monocots.
Tridax :- In tridax several vascular bundles are arranged in one ring & very close to the pericycle.

785. Helianthus distinguished from maize based on this anatomical character
(a) Protoxylem lacuna absent, phloem parenchyme absent
(b) Protoxylem lacuna present, phloem parenchyme present
(c) Protoxylem lacuna absent, phloem parenchyme present
(d) Protoxylem lacuna present, phloem parenchyme absent

AP EAMCET-25.04.2018 Shift-I

Ans. (c) : Vascular bundle of monocot stem, protoxylem disintegrates and form a cavity. This is called protoxylem lacuna:
Example: - Maize
• Phloem parenchyma is found in both primary & secondary phloem. It is a part of the phloem elements. These are found in dicot roots, leaves & stem but are absent in monocot plants.
Example :- Helianthus

786. In A,B,C, plants with
(A) Plant grow in arid zone
(B) Absorb more water during rainy reason
(C) Withstand prolonged dryness are
(a) Tribulus, Asparagus, Casuarina
(b) Tridax, Asparagus, Casuarina
(c) Tridax, Tribulus, Asparagus
(d) Maize, tridax, Asparagus

AP EAMCET-25.04.2018 Shift-I

Ans. (a) : ***Tribulus terrestris*****:-** (family - zygophyllaceae) is a widespread pantropic weed, that grow as a weed on sandy soils in tropical and desert climatic regions around the world.
• **Asparagus:-** Asparagus needs regular watering, especially while young, give it 1 to 2 inches of water per week during its first two growing seasons.
• **Casuarina:-**Xerophytes are plants of dry habitats, where the environment favours high rate of transpiration than the absorption. Their leaves are vestigial to cut transpiration & to survive in dry environment.

787. Study the following list

List – I	List – II
(A) Blue dye	**(I) Belladona**
(B) Yellow dye	**(II) Ruscus**
(C) Medicine	**(III) Indigofera**
(D) Edible oil	**(IV) Soyabean**
	(V) Butea

	A	B	C	D
(a)	V	III	II	IV
(b)	III	I	V	II
(c)	III	V	I	IV
(d)	III	II	I	IV

AP EAMCET-25.04.2018 Shift-I

Ans. (c) :
Blue dye (Colour):- The blue or indigo dye is obtained from the leaves of *Indigofera tinctoria*
Yellow dye (Colour):- Isobutrin is a yellow dye extracted from the *Butea monosperma* flower. It is commonly known as flame of the forest.

@apna_pdf

Medicine:- Belladonna (*Atropa belladonna*) has been used in alternative medicine as an aid in treating arthritis pain, colds or hay fever. It is a poisonous plant called deadly nightshade (solanaceae - family)

788. Math the following

List –I	List –II	List – III
(A)Mango	**(i)*Dolichos lablab***	**(I) Hesperidium**
(B Orange	**(ii)*Annona squamosa***	**(II)Aggregate fruit**
(C)Bean	**(iii)*Citrus sinensis***	**(III) Drupe**
(D)Custard apple	**(iv)*Mangifera indica***	**(IV) Legume**

	A	B	C	D
(a)	iii, I	ii, IV	i, III	iv, II
(b)	iv, III	ii, IV	i, II	iii, I
(c)	iv, III	iii, I	i, IV	ii, II
(d)	iii, III	iv, I	ii, II	i, IV

AP EAMCET-25.04.2018 Shift-I

Ans. (c) :

Fruit name	Botanical name	Types of fruit
(A) Mango	*Mangnifera indica*	Drupe
(B)Orange	*Citrus sinensis*	Hesperidium
(C) Bean	*Dolichos lablab*	Legume
(D) Custard apple	*Annona squamosa*	Aggregate fruit.

789. Which of the following is the correct floral formula for the floral diagram given below?

(a) Br ⊕ ⚥ Epi $K_{5 \text{ or } (5)} \widehat{C_5 A_{(\infty)}} \underline{G}_{(2\ \infty)}$

(b) ⊕ ⚥ $K_{(5)} \widehat{C_5 A_{(5)}} \underline{G}_{(2)}$

(c) % ⚥ $K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$

(d) ⊕ ⚥ $\widehat{P_{3+3 \text{ or } (3+3)} A_{3+3}} \underline{G}_{(3)}$

AIIMS-2013,2018
Kerala PMT - 2013

Ans. (c) : The given floral diagram is of fabaceae family. It is zygomorphic, bisexual, sepals five and gamosepalous, petals five and papilionaceous anther ten and diadelphous ovary superior and monocapellary.

% ⚥ $K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$

Inflorescence : Racemose

Flower : Bisexual, zygomorphic

Calyx : Sepals five, gamosepalous; imbricate aestivation.

Corolla : Petals five, polypetalous, papilionaceous, consisting of a posterior standard, two lateral wings, two anterior ones forming a keel (enclosing stamens and pistil), vexillary aestivation.

Androecium and gynoecium: Ten, diadelphous superior, monocarpellary, unilocular with many ovules, style single.

Fruit : Legume, seed : one to many, non-endospermic.

790. Omega 3 fatty acid is present in
(a) sunflower oil (b) flax seed oil
(c) groundnut oil (d) butter

JIPMER-2018

Ans. (b) : The three main omega- 3 fatty acids are:-
1 – Alpha - linolenic acid (ALA)
2 – Eicosa pentaenoic acid (EPA)
3 – Docosa hexaenoic acid (DHA)
• ALA is found mainly in plant oils such as flaxseeds, soyabean, & canola oil.

791. Perianth is found in which family?
(a) Cruciferae (b) Solanaceae
(c) Liliaceae (d) Malvaceae

JIPMER-2018

Ans. (c) : Perianth is found in Liliaceae. The perianth is the outermost whorl, of the flower that consists of petals and sepals in an undifferentiated form.
In Liliaceae family, the number of perianth is six which are arranged in two whorl of three each.

792. Study the following lists:

List I		List II	
A.	**Spadix**	**(i)**	**Acacia**
B.	**Valvate**	**(ii)**	**Tridax**
C.	**Cassia**	**(iii)**	**Calotropis**
D.	**Schizocarpic**	**(iv)**	**Colocasia**
		(v)	**Zygomorphic**

The correct answer is

	A	B	C	D
(a)	(iii)	(iv)	(ii)	(v)
(b)	(iv)	(iii)	(v)	(i)
(c)	(ii)	(iv)	(v)	(iii)
(d)	(iv)	(iii)	(ii)	(i)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Spadix it is a type of inflorescence having small flowers borne on a fleshy stem. This inflorescence is found in Colocasia, Maize and Palms.
• **Valvate -** In this type of aestivation, the arrangement of sepals and petals in whorls condition just touch each other at the margin but do not overlap. Ex. - Calotropis.
• **Cassia** - It is an example of a zygomorphic flower with imbricate aestivation.
• **Schizocarpic -** This fruit also called splitting fruit, is a type of dryfruit that upon maturing split into one-seeded parts called mericarps.
Ex. : - Acacia, Castor

793. Statement-A: A plant Pentadiplandra brazzeana produces a protein called brazzein.
Statement B: This protein is low caloric sweetner, i.e. it is used in the treatment of diabetes.

@apna_pdf

(a) A and B both are correct but B is not the correct explanation of A
(b) A and B both are correct B is the correct explanation of A
(c) A is correct and B is wrong
(d) A is wrong and B is correct

GUJCET-2017

Ans. (a) : *Pentadiplandra brazzena* belongs to family capparaceae. In this family unilocular with parietal placentation (ovary) is found and indehiscent fruit type lacking a replum.

• The protein Brazzein is a low-calorie sweetener and is heat stable and thus, used for the treatment of diabetes. Hence, the reason is correct.

Both assertion and reason are correct but the reason is not the correct explanation for the assertion.

794. The floral formula of *Pisum sativum* (pea plant)

(a) $\text{Br Ebrl}\oplus\male\female K_{(5)}\overset{\frown}{C_{(5)}}A_5\underline{G}_{(2)}$

(b) $\text{Br Brl \%}\male\female K_{(5)}C_{1+2+(2)}A_{(9)+1}G_1^-$

(c) $\text{Br Ebrl}\oplus\male\female P_{(3+3)}A_{(3+3)}\underline{G}_{(3)}$

(d) $\text{Br Ebrl \%}\male\female K_{(5)}\overset{\frown}{C_{(5)}}A_5\underline{G}_{(2)}$

TS EAMCET-12.05.2017

Ans. (b) :

$\text{Br Brl \%}\male\female K_{(5)}C_{1+2+(2)}A_{(9)+1}G_1^-$

Pisum sativum (pea plant) belongs to Papilionaceae sub – family. The flower is bracteate, bracteolate, bisexual and zygomorphic.

• The inflorescence is racemose.
• They have 5 sepals which are joined to form the tube.
• They have 5 dawed petals.
• They have diadelphous stamens. The 9 stamens are fused to form a sheath around the pistil. The posterior stamen is free.
• The pistil has single carpel. The ovary is superior. It has marginal placentation.

795. Which one of the following does not belong to Solanaceae

(a) *Nicotiana tobacum*
(b) *Withania somnifera*
(c) *Derris indica*
(d) *Lycopersicon esculentum*

TS EAMCET-12.05.2017

Ans. (c) : • *Derris indica* is the genus of leguminous plants of the fabaceae family.

• *Nicotiana tobacum* (tobacco) is an annually – grown herbaceous plant belongs to the family solanaceae.

• *Withania somnifera* commonly known as ashwagandha, is a plant in the solanaceae family

796. Many carpels are free and each carpel of apocarpous gynoecium develops into a fruitlet in

(a) *Oryza sativa* (b) *Acacia arabica*
(c) *Annona squamosa* (d) *Vitis vinifera*

TS EAMCET-12.05.2017

Ans. (c) : The gynoecium is the female reproductive part of a flower, consisting of one or more carpels.

• If a gynoecium has a single carpel, it is called monocarpous. If a gynoecium has multiple, distinct (free, unfused) carpels, it is called apocarpous.

• In some fruits, each carpel of an apocarpous pistil develops into a berry. During this development the margins of the carpels may be fused (e.g. In *Annona squamosa)* or they may remain separate (e.g. In *Artabotrys odoratissimus*).

• In *Annona squamosa*, the mesocarp of berries is edible.

797. Match the following

List–I		List–II		List–III	
A.	**Thorn**	**I.**	**Umbel**	**i.**	**Bougainvillea**
B.	**Unisexual flower**	**II.**	**Polychasial cyme**	**ii.**	**Cocos nucifera**
C.	**Stolons**	**III.**	**Spadix**	**iii.**	**Neriu**
D.	**Storage root**	**IV.**	**Cymule**	**iv.**	**Carro**

The correct answer is
Options:

	(A)	**(B)**	**(C)**	**(D)**
(a)	IV,i	III,ii	II,iii	I, iv
(b)	IV,ii	III, i	IV,iii	I, iv
(c)	IV, i	II, iii	III, ii	I, iv
(d)	IV,i	III,iv	II,iii	I, ii

AP EAMCET-28.04.2017 Shift-II

Ans. (a) :

List – I (Features)		**List - II (Infloresence)**	**List - III (Plants)**
A.	Thorn	Cymule	Bougain villea
B.	Unisexual flower	Spadix	Cocos nucifera.
C.	Stolons	Polychasial chyme	Nerium
D.	Storage root	Umbel	Carrot

798. Which of the following plants produce zygomorphic flowers?

(a) Hibiscus (b) Canna
(c) Gulmohar (d) Mustard

Karnataka CET-2017

Ans. (c) : The largest petal overlaps the two lateral petals called wings while the two anterior petals are the smallest ones.

• Due to this specific arrangement of petals in the corolla, the flower exhibits bilateral symmetry. Therefore, Gulmohar is an example of a zygomorphic flower.

@apna_pdf

799. Stamens with long bifurcated connective are found in ____flower.

(a) Bignonia (b) Bombax
(c) Salvia (d) Cestrum

MHT CET-2017

Ans. (c) : Flower of Salvia have two stamens which are epipetalous. The two anther lobes are connected by a long curved connective.

• One of the anther lobes is sterile (lower branch). And other lobes is fertile (uper branch).

800. Match the following lists

List -I	List-II
(A) Monocarpellary ovary	**(I) Papaver**
(B) Apocarpous ovary	**(II) Dolichos**
(C) Syncarpous ovary	**(III) Allium**
(D) Tricarpellary ovary	**(IV) Michelia**
	(V) Abutilon

The correct answer is
Options:

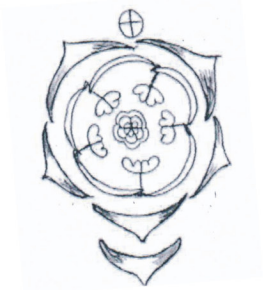
	A	B	C	D
(a)	II	I	IV	III
(b)	II	IV	I	III
(c)	II	V	I	III
(d)	II	III	IV	I

AP EAMCET-28.04.2017 Shift-I

Ans. (b) :

Type of ovary	Plants
A - Monocarpellary ovary.	Dolichos (bean)
B - Apocarpous ovary	Michelia (magnolia)
C - Syncarpous ovary	Papaver (poppy)
D - Tricarpellary ovary	Allium cepa (onion)

801. Find the correct description of the flower in general and 1st and 3rd whorl of flower based on the diagram illustrated below:



(a) Bracteate, ebracteolate, pentamerous, bisexual, Gamosepalous, twisted aestivation. stamens 5, epipetalous
(b) Ebracteate, ebracteolate, pentamerous, bisexual, polysepalous, imbricate aestivation, stamens 5, epiphyllous
(c) Ebracteate, ebracteolate, pentamerous, bisexual, gamosepalous, valvate aestivation, stamens 5, monoadelphous
(d) Bracteate, ebracteolate, pentamerous, bisexual, polysepalous, imbricate aestivation, stamens 5, epipetalous

AP EAMCET-28.04.2017 Shift-I

Ans. (d) : Generally, a flower has four types of whorls-
(i) an outer calyx consisting of sepals.
(ii) the corolla, consisting of petals.
(iii) the androecium, or group of stamens
(iv) the gynoecium, or group of pistil.
The corret description of given floral diagram is-
Bracteate, ebracteolate, pentamerous, bisexual, polysepalous, imbricate aestivation, stamens 5, epipetalous

802. *Ricinus communis* is the host plant of the silkworm called

(a) Mulberry silkworm (b) Tasar silkworm
(c) Eri silkworm (d) Muga silkworm

Tripura JEE-2017

Ans. (c) : *Ricinus communis* (castor) is the host plant of the silkworm called Eri silkworm. Castor oil plant has great commercial use in pharmaceutical industries. The silkworm that feed on mulberry leaves are called mulberry silkworm and important food plants of tasar silkworm are Arjun, Asan (*Terminalia tomentosa*) and Sal.

803. The plant having milky latex is

(a) *Phyllanthus emblica* (b) *Ricinus communis*
(c) *Jatropha curcas* (d) *Euphorbia tirucalli*

SRM JEEE -2017

Ans. (d) : The plant having milky latex is *Euphorbia tirucalli.* Euphorbia tirucalli is a tree native to Africa that grows is semi-arid tropical climates. It produces a poisonous latex that can cause temporary blindness.

804. Which among the following members is not economically important as a food?

(a) *Solanum tuberosum*
(b) *Solanum melongena*
(c) *Lycopersicon esculentum*
(d) *Solanum trilobatum*

SRM JEEE -2017

Ans. (d) : Thuduvalai known by its botanical name *Solanum trilobatum* is an important medicinal plant called as kayakalp herb, used extensively in respiratory issues.

805. One of the following is a source of rubber

(a) *Cedrus deodara* (b) *Tectona grandis*
(c) *Hevea brasiliensis* (d) *Michelia champaca*

SRM JEEE-2017
AIIMS-1998

Ans. (c) : *Hevea brasiliensis* is known as the para rubber tree, sharinga tree or most commonly the rubber tree is a tree belong to the family Euphorbiaceae.

806. Heroin is obtained from plant of family:

(a) Papaveraceae (b) Leguminosae
(c) Cruciferae (d) Liliaceae

JCECE-2004

Ans. (a) : Heroin is obtained from plant of *papaver somniferum* and *papaveraceae* family. The papaveraceae are an economically important family. Mostly occurs in temperate region.

807. Trimerous flower, superior ovary and axile placentation is characteristics of:

(a) Liliaceae (b) Cucurbitaceae
(c) Solanaceae (d) Compositae

BHU PMT (Screening)-2005

@apna_pdf

Ans. (a) : Trimerous flower, superior ovary and axile placentation is characteristics of liliaceae. The lily family Liliaceae, consists of about 254 genera and 4075 species of flowering plant within the order liliales.
They are monocotyledonous, perennial herbaceous.

808. Presence of persistent calyx is a feature of family
(a) solanaceae (b) gramineae
(c) malvaceae (d) compositae
UP CPMT-2006

Ans. (a): The group of sepals is called calyx. Calyx are the sepal of a flower typically forming a whorl that enclose the petals and forms a protective layer around a flower in bud. In Solanaceae, the calyx is having five sepals, green, gamosepalous, tubular showing valvate aestivation. Persistent calyx (one remaining after corolla has withered) is a character of solanaceae as the calyx stays with the matured fruit at the later stage.

809. Opposite decussate and stipulate leaves is the characteristic feature of members of family :
(a) Rubiaceae (b) Asclepiadaceae
(c) Malvaceae (d) Rosaceae
Uttarakhand PMT-2006

Ans. (a) : The Rubiacae are a family of flowering plants, commonly known as the coffee, madder, or bedstraw family. It consists of terrestrial tree, shrubs, Oliaras herbs that are recognizable by simple opposite leaves with interpetiolar stipules and sympetalous actinomorphic flowers.

810. Raticide poisons are obtained from : (1) Dracaena (2) Scilla (3) Colchicum (4) Urginea
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct
BHU PMT (Mains)-2005

Ans. (c) : Reticide poisons are obtained from the bulbs of Seilla and urginea. Rat poison is called rodenticide it is used for the purpose of killing rodents.
• Raticide poisons are obtained from both Scilla and Urginea belongs to the family Asparagaceae. These substances kill by preventing normal blood clotting and causing internal hemorrhaging.
• It is bitter & due to this many animals avoid but rats eat readily & die due to toxic scilliroside (toxic compound).

811. Velamen is found in :
(a) Vanda (b) Rosa
(c) Viscum (d) Sanctlum
Uttarakhand PMT-2004

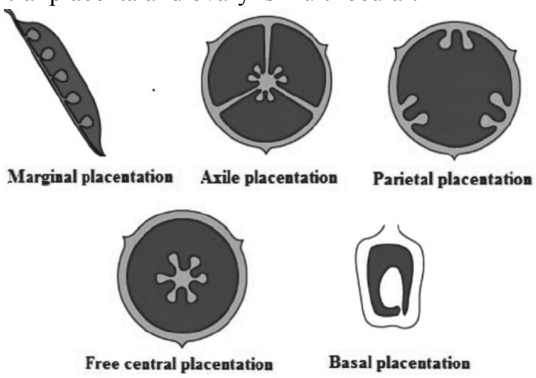
Ans. (a) : Velamen is a multilayered tissue that is spongy in nature which covers the aerial roots of epiphytic plants such as orchids.
Aerial roots of orchids are able to absorb atmospheric water and conduct it to the root interior. The water is absorbed by imbibitions process.

812. Which of the following is exotic species?
(a) Parthenium (b) Lantana
(c) Eichhornia (d) All of these
AFMC -2009

Ans. (d) : An exotic species is known as a species which is living outside its range and was transported to another area by humans.
• Lantana, Eichhornia and Parthenium all are exotic species, which had been introduced in India.
• They have harmful impact resulting in the extinction of indigenous species.

813. Placentation found in tomato is
(a) marginal (b) axile
(c) parietal (d) basal
J&K CET-2014

Ans. (b) : Axile placentation is seen in tomato. In this type of placentation, the ovary is partitioned into two or more chambers by septa. The ovules are borne on the central placenta and ovary is multilocular.



• **Marginal plantation:-** Ex. – Pea & Cassia
• **Parietal Placentation:-** Ex.– Radish, Papaya
• **Basal placentation:-** Ex.– marigold, sunflower

814. Which one of the following is being tried in India as a bio fuel substitute for fossil fuels?
(a) Jatropha (b) Azadirachta
(c) Musa (d) Aegilops
JCECE-2015

Ans. (a) : *Jatropha curcas* belonging to family Euphorbiaceae, a perennial plant produces seed with 31 - 37 percent of oil, which can be combusted as fuel with out being refined.
• Jatropha oil can be used directly after extraction (i.e. without refining) in diesel, generators and engines.

815. Root pockets can be seen in:
(a) Nelumbo (b) Nymphaea
(c) Hydrilla (d) Pistia
AP EAMCET-2000

Ans. (d) : Root pockets are basically root caps but have lost there utility due to non -use. Pitia is a hydrophyte where root pockets are present.
• Root pockets are vestigial (non-functional) because the roots of the plants that hang freely in water have no friction or resistance from the soil particles to overcome. It is found only in floating aquatic plants like Pistia, Water hyacinth and Trapa.

816. Parkinsonia is a good example of
(a) winged fruit
(b) phyllode
(c) parachute mechanism

@apna_pdf

(d) phylloclade.

AIIMS-1994

Ans. (b) : In some plants petiole changes and it looks like a leaf due to environmental reasons and is known as phyllode. Phyllods do not bear leaves, branches flowers and also have potential of photosynthesis.
- *Parkinsonia aculeata* has a high tolerance to drought, simply attaining horter stature.
- Main stems like branches and flower stalks can also become phyllodes.
- The Mexican paloverde (*Parkinsonia aculeata*) also has phyllodes.

817. Syncarpous ovary can be seen in
(a) Mustard (b) Wheat
(c) Maize (d) Butter cup

UP CPMT-2013

Ans. (a) : Syncarpous is a condition in which the carpels of the gynoecium are united in a compound ovary. The syncarpous ovary is responsible for the formation of only one fruit with one or many seeds.
Example: tomato and mustard.

818. Pea plant belongs to the family
(a) Solanaceae (b) Poaceae
(c) Fabaceae (d) Compositae

UP CPMT-2013

Ans. (c) : The fabaceae family is a large family of the plant kingdom. The family Fabaceae is also known as Leguminosae or Papilionaceae family.
Example: Pea (*Pisum sativum*)
- Fabaceae family is divided into three sub-family
1. Papilionaceae 2. Caesalpinaceae 3. Mimosaceae

819. Family Podostemaceae is placed under the Series
(a) Multiovulatae aquaticae
(b) Microembryeae
(c) Daphnales
(d) Unisexuales
(e) Heteromerae

Kerala PMT-2008

Ans. (a) : Podostemaceae family is placed under the series of multiovulatae aquaticae (aquatics with numerous ovules). It is a family of aquatic plants. The ovary is 2-3 carpellate and superior, placenta is fleshy and axillary. The ovules are axile and anatropous.

820. Match the items in Column I with Column II and choose the correct answer

	Column I		**Column II**
(A)	**Artemesia sp.**	**(1)**	**Insecticide**
(B)	**Solidago sp.**	**(2)**	**Santonin**
(C)	***Eclipta alba***	**(3)**	**Dropsy**
(D)	***Chrysanthemum roseum***	**(4)**	**Tonic in spleen enlargement**

(a) A-2, B-3, C-4, D-1
(b) A-1, B-2, C-3, D-4
(c) A-3, B-4, C-2, D-1
(d) A-4, B-3, C-2, D-1
(e) A-3, B-1, C-4, D-2

Kerala PMT-2008

Ans. (a) :	
(A) Artemesia sp.	Santonin
(B) Solidago sp.	Dropsy
(C) *Eclipta alba*	Tonic in spleen enlargement
(D) *Chrysanthemum roseum*	Insecticide

821. Which of the following represents the floral characters of Liliaceae?
(a) Six petals, zygomorphic, six stamens, bilocular ovary, axile placentation
(b) Tetramerous, actinomorphic, polphyllous, unilocular ovary, axile placentation
(c) Trimerous, actinomorphic, polyandrous, superior ovary, axile placentation
(d) Bisexual, zygomorphic, gamophyllous, inferior ovary, marginal placentation
(e) Unisexual, actinomorphic, trilocular, inferior ovary, axile placentation

Kerala PMT-2008

Ans. (c) : Liliaceae is a family of monocotyledonous family. It is also known as the "lily family".
- Characters of Liliaceae are trimerous, actinomorphic, polyandrous, superior ovary, axile placentation. It includes medicinal plants like Aloevera, Colchicum and Vegetable like onion, garlic, asparagus.

822. Potato is included in solanaceae family because
(a) it is epipetalous
(b) it is pentamerous
(c) ovary is slightly diverted from its position
(d) all the above

AIIMS-1997

Ans. (d) : Potato (*Solanum tuberosum*) is the member of family solanaceae, which is characterized by Obliquely placed superior ovary, epipetalous, pentamerous flowers.
It is a large family and world wide distribution plants are motly herbs, shrubs and small trees.

823. Which of the following is the largest and edible bud?
(a) cabbage (b) onion
(c) cauliflower (d) Agave.

AIIMS-1997

Ans. (a) : Cabbage is the largest edible bud . In cabbage plant the stem is so short that the great mass of thick overlapping leaves tend to form a head. Cabbage and head lettuce are enlarged terminal buds. It is a leafy, biannual domesticated plant very popular because of its dense-leaves heads.
- The older leaves surround the younger smaller more tender leaves and the cabbage resembles a huge bud.

824. Wax is obtained from:
(a) jojoba (b) guayle
(c) leucaena (d) subabul

J&K CET-2002

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Ans. (a) : Wax is obtained from the seed of Jojoba plant (S. chinensis), a shrub belonging to the family - simmondsiaceae.

- Wax plant is also called pig nut, deer nut, goat nut, wild hazel. Jojoba wax is extracted from the seed.

825. In which one of following would you except to find glyoxysomes?

(a) Endosperm of wheat
(b) Endosperm of castor
(c) Palisade cells in leaf
(d) Root hair

CMC Vellore-2013

Ans. (b) : Glyoxysomes are present in cotyledons or endosperm of the germinating fatty acid, rich in fatty acids. They serve as an enzymatic site for reactions including the conversion of stored fatty acids to carbohydrates. It can be found in seeds containing fats and oils like corn, soybean, sunflower.

Therefore, glyoxysomes will be present in endosperm of castor.

826. Plant material, which is used in culture medium is obtained from

(a) Cycos (b) Coconut milk
(c) Pinus (d) Mango

BHU PMT (Mains)-2010

Ans. (b) : *Cocos nucifera* (coconut milk) is the scientific name for coconut. Coconut milk is mainly used as culture medium.

- Skoog observed that coconut milk stimulated cell division. Due to contained a substance was later on called cytokinin.

827. The anthers in Solanaceae are:

(a) monothecus, introrse
(b) dithecus, extrorse
(c) dithecous, introrse
(d) monothecus, extrorse

BVP-2003

Ans. (c) : The family solanaceae is commonly called potato family. The anthers are dithecous and they dehiscence by introrse mode.

Ex. Tomato , Potato, Brinjal.

828. Turpentine oil is obtained from:

(a) *Pinus longifolia* (b) *Melia azadirachta*
(c) Eucalyptus (d) all of the above

BVP-2003

Ans. (a) : Turpentine is a well - known essential oil extracted by distillation from *Pinus longifolia*.

- Turpentine oil is the fluid formed by the distillation of resins that obtained from the pine tree or pinus. It is used as a solvent and oil based paints.

829. *Simmondsia chinensis* is commonly known as:

(a) amia (b) poppy
(c) teak wood (d) jojoba

BVP-2005

Ans. (d) : Jojoba (*Simmondsia chinensis*) also called goat nut pig nut, deer nut and wild hazel belongs to the family simmondsiaceae.

830. Which of the plant yield sunhemp?

(a) Cannabis (b) Crotaleria
(c) Corchorus (d) Hibiscus

BVP-2002

Ans. (b) : *Crotalaria juncea* belong to family fabaceae commonly known as rattlepod, it is a source of natural fibres.

- It is an erect, herbaceous, laxly branched annual.
- The fibres is made into cordage, fishing nets, sacking fabrics and is used to manufacture such paper products as cigarette and tissue paper.

831. Monoadelphous condition of stamens is found in:

(a) Malvaceae (b) Cyperaceae
(c) Cruciferae (d) Solanaceae

BVP-2002

Ans. (a) : Monoadelphous condition of stamens is present in Malvaceae family in which all the filament of the stamens are united into a single bundle to form a tube like structure but anther remains free. For example - China rose

832. Match Column I with II and choose the right option

I	II
1. Artemisia	A. Fibre
2. Astragalus	B. Insecticide
3. Phormium	C. Rat poison
4. Chrysanthemum	D. Medicine
5. Withania	E. Vermifuge
	F. Gum

(a) 1 - D 2 - C 3 - F 4 - B 5 - E
(b) 1 - B 2 - E 3 - D 4 - C 5 - A
(c) 1 - C 2 - E 3 - A 4 - F 5 - D
(d) 1 - F 2 - E 3 - A 4 - B 5 - D
(e) 1 - E 2 - F 3 - A 4 - B 5 - D

Kerala PMT-2009

Ans. (e) : 1. Artemesia is a large and diverse genus of plants belongs to family asteraceae. Santonin is a drug which is obtained from Artemesia as a vermifuge (antihelminthic drug).

2. Astragalus is a genus of herbs and small shrubs belong to family - leguminosae or fabaceae. The natural gum tragtaeanth is made from several species of Astragalus.

3. Phormium is a genus of two plant species belonging to family liliaceae. Phormium produces longleaf fibers that have played an important role in the culture, history and economy of New Zealand.

4. Chrysanthemum is a genus of flowering plants belong to the family Asteraceae. It is economically important as a natural source of insecticide.

5. *Withania somnifera* (Ashwagandha) is the species of plant belong to family solanaceae. It is used in Ayurvedic, Unani medicines

833. Select the characters which are not applicable to the family Solanaceae ?

(A) Epipetalous and syngenesious anthers
(B) Bicarpellary and syncarpous ovary
(C) Oblique ovary with axile placentation
(D) Stamens six, arranged in two whorls

@apna_pdf

(E) Bicarpellary, syncarpous and inferior ovary

(a) B and C only (b) A, D and E only
(c) B, D and E only (d) A and C only
(e) C, D and E only

Kerala PMT-2009

Ans. (b) : Characteristic feature of solanaceae family are :-
i. Inflorescence – Axillary cyme.
ii. Flower :- Pentamerous, bisexual hypogynous.
iii. Calyx :- Gamosepalous, persistent
iv. Corolla :- Gamopetalous, valvate aestivation
v. Androecium :- five stamens, Anther basifixed, epipetalous
vi. Gynoecium :- syncarpous, binocular, superior ovary, bicarpellary axile placentation.

834. Which one of the following represent the floral characters of Poaceae ?

(a) Pedicellate, bracteate, bisexual, tetramerous, actinomorphic, complete and superior ovary
(b) Pedicellate, bracteate, bisexual, pentamerous, zygomorphic, complete and superior ovary
(c) Sessile, bracteate, bracteolate, incomplete, uni or bisexual, perianth modified into lodicules, stamens three, syncarpous, superior ovary and feathery stigma
(d) Bracteate, unisexual, actinomorphic, stamens five and inferior ovary
(e) Bracteate, bracteolate, bisexual, pentamerous, actinomorphic, complete and superior ovary

Kerala PMT-2009

Ans. (c) : Floral characters of poaceae family are as follows:–
i. Flower is without stalk (sessile), spikelet inflorescence, unisexual or bisexual, presence of lodicules.
ii. Androecium has three stamens, anthers are versatile, gynoecium is tricarpellary syncarpous, unilocular ovary, feathery stigma.
iii. Fruit is caryopsis with the embryo situated towards a side at the base, presence of coleoptile and colorhiza.

835. The characteristic type of placentation found in the members of Caryophyllacea is

(a) Parietal (b) Marginal
(c) Basal (d) Axile
(e) Free central

Kerala PMT-2009

Ans. (e) : Free central placentation found in the members of caryophyllaceae family. Here, the pistil is polycarpellary and syncarpous but the ovary is unilocular.

836. Match the following and choose the correct combination from the option given.

Column– I (Family)	Column - II (Androecium Formula)
A. Brassicaceae	**1. A_{3+3}**
B. Fabaceae	**2. $A_{(5)}$**
C. Solanaceae	**3. $A_{(9)+1}$**
D. Liliaceae	**4. A_{2+4}**

(a) A -4 B - 3 C - 2 D - 1
(b) A- 1 B - 2 C - 3 D - 4
(c) A- 2 B - 3 C - 4 D - 1
(d) A- 3 B - 4 C - 1 D - 2
(e) A- 4 B - 3 C - 1 D - 2

Kerala PMT-2012

Ans. (a) : i. Brassicaceae :- Tetradynamous, consisting of 4 long inner stamens and 2 short outer stamens.
ii. Fabaceae :- Androecium is ten and usually diadelphous. It is a condition where the stamens are fused by their filaments while the anthers are free.
iii. Solanaceae :- Androecium contain five stamens epipetalous anthers basifixed.
iv. Liliaceae :- Androecium contains six polyandrous stamens, which are epiphyllous and present in 2 whorls.

837. Find out the correctly matched pair

Palcentation Types	Represented in
(a) Marginal	Tomato
(b) Axile	Pea
(c) Parietal	Primrose
(d) Free Central	Argemone
(e) Basal	Marigold

Kerala PMT-2012

Ans. (e) :

Palcentation Types		Represented in
(a) Marginal	→	Pea
(b) Axile	→	Tomato
(c) Parietal	→	Argemone
(d) Free central	→	Primrose
(e) Basal	→	Marigold

838. The distinct features of Fabaceae are

(a) Zygomorphic, diadelphous and monocarpellary
(b) Actinomorphic, monadelphous and monocarpellary
(c) Zygomorphic, monadelphous and pentacarpellary
(d) Zygomorphic, polyadelphous and tricarpellary
(e) Zygomorphic, diadelphous and bicarpellary

Kerala PMT-2012

Ans. (a) : Fabaceae or leguminosae is a large and economically important family of flowering plants.
- In fabaceae, the flowers are zygomorphic and bisexual.
- The stamens are 10, diadelphous (stamens united by their filaments so as to form two groups.)
- The gynoecium is monocarpellary, syncarpous, superior ovary.

839. Choose the specific characters of flowers of Canna

(a) Actinomorphic and radial symmetry
(b) Irregular and bilateral symmetry
(c) Irregular and zygomorphic
(d) Irregular and radial symmetry

@apna_pdf

(e) Irregular and asymmetric

Kerala PMT-2012

Ans. (e) : The flowers are asymmetric and is composed of 3 sepals and 3 petals that are small, inconspicuous irregular and hidden under extravagant stamens.

840. Match the following lists

List-I	List-II
(A) Alstonia	**(I) Roots at lower nodes of the stem**
(B) *Ananus sativus*	**(II) Leaflets are attached at a common point in the leaf**
(C) Sugarcane	**(III) Swollen placenta**
(D) *Bombax ceiba*	**(IV) more than two leaves at every node**
	(V) Underground lateral branches producing aerial leafy shoots

	(A)	(B)	(C)	(D)
(a)	(IV)	(II)	(V)	(I)
(b)	(IV)	(V)	(I)	(II)
(c)	(V)	(III)	(I)	(II)
(d)	(V)	(III)	(I)	(IV)

AP EAMCET-2014

Ans. (b) :
Alstonia is a genus of evergreen trees and shrubs, family of Apocynaceae. It contains more than two leaves at every node.
Ananus Sativus it undergrounds lateral branches producing aerial leafy shoots.
Sugarcane roots are found at lower nodes of the stem.
Bombax Ceiba in bombax ceiba, leaflets are attached at a common point in the leaf.

841. Four plants (A,B,C,D) are observed. 'A' has cartilagenous endocarp in the fruit and fleshy thalamus as chief edible part 'B' has caryopsis fruit with endosperm as the chief edible part. In 'C' each carpel of apocarpous gynoecium develops into a fruitlet and its mesocarp and endocarp are the chief edible parts 'D' has syconus fruit with edible fleshy peduncle. To which families A, B, C, and D belong respectively?

(a) Rosaceae, Poaceae, Announces Moraceae
(b) Annonaceae, Rosaceae, Moraceae, Rutaceae
(c) Solanacene , Cucurbitaceae, Anacardiaceae, Moraceae
(d) Rustaceae, Anacardiaceae, Rosaceae, Fabaceae

AP EAMCET-2014

Ans. (a) : Rosaceae :- The fruit remains surrounded by fleshy thalamus. The fleshy thalamus makes the edible part, whereas the actual fruit lies within it.

- The outer portion of the pericarp is fleshy and fused with the thick edible portion.
- The inner layer of pericarp is cartilaginous and forms the core surrounding the seeds.

example- Apple, pears etc.

2. Poaceae:- Caryopsis is one - chambered and one - seeded fruit which develops from a superior monocarpellary ovary. Here the pericarp remains fused with the seed coat.
example- maize, wheat, Barley, Millets etc.
3. Annonaceae:- The charactersties example of Annonaceae is found in Rubus (raspberry). It develops from superior, polycarpellary and apocarpous gynoecium. The carpels are borne on a conical thalamus.
4. Moraceae:- Syconus is a type of composite fruit under family moraceae develops from a hollow, pear - shaped fleshy receptacle which encloses numerous minute male & female flower.

842. Identify the characters of mustard, chilli cauliflower respectively

(a) Axile placentation, tricarpellary gynoecium, sessile flowers
(b) Inferior ovary, zygomorphic flower, corymb
(c) Whorled phyllotaxy, unilocular ovary, production of flowers at the same node of the peduncle
(d) Hypogynous flower, unilocular ovary, corymb

AP EAMCET-2014

Ans. (d) : Mustard and the cauliflower belong the the family of Brassicaceae. The characters of the mustard include herbaceous plants bisexual, complete and actinomorphic flowers having hypogynous ovary with a single ovary. The characteristics of the chilli belong to the family of solanaceae which is made of a large number of a vegitable crops, medicinal crops, shrubs or trees with petiolate leaves.

843. Which one of the following families shows both freedom and fusion in four successive whorls of the flower from exterior in different members?

(a) Malvaceae (b) Solanaeeae
(c) Asteraceae (d) Liliaceae

JCECE-2010

Ans. (d) : Liliaceae families shows both freedom and fusion in four successive whorls of the flower from exterior in different members. Liliaceae family has superior ovaries which means they are hypogynous and syncarpous along with three fused carpels and are either trilocular or unilocular.

844. Inflorescence of family-Compositae is

(a) perianth (b) lodicule
(c) capitulum (d) hypanthodium

JCECE-2010

Ans. (c) : Asteraceae or compositae has flowers aggregated in inflorescence called head and capitulum. In this inflorescence, main axis is flat and considered as receptacle. It bears many small and sessile, bisexual florets called disc florets at centre and one or two whorls of sessile unisexual florets called ray florets towards the periphery.

845. *Tectona grandis* belongs to family :

(a) Verbenaceae (b) Anacardiaceae
(c) Rubiaceae (d) Lamiatae

BVP-2000

@apna_pdf

Ans. (b) : *Tectona grandis* (Teak) is a tall tree from Southeast Asia & is widely cultivated for its durable wood.

- It is a member of the mint family lamiaceae, which is better known for its aromatic members such as basil, oregano and rosemary.
- In older classification, it belongs to the family verbenaceae.

846. Aswagandha is called as :
(a) *Raiwolfia serpentine*
(b) *Withania somnifera*
(c) *Datura stramonium*
(d) *Cannabis sativa*

BVP-2000

Ans. (b) : Aswagandha is commonly known as " Indian winter cherry" or " Indian Ginseng",

- Ashwagandha is called as - *Withania somnifera*.
- It is one of the most important herb in Ayurveda.
- Aswagandha belongs to family solanaceae it is used for stress relief and improve general health.

847. Peanut oil is obtained from :
(a) *Glycine max* (b) *Arachis hypogaea*
(c) *Pisum sativum* (d) *Lathyrus odoratus*

BVP-2000

Ans. (b) : Peanut or groundnut oil is obtained from the seed kernels of *Arachis hypogaea*.

- It is the healthy and nutritive source of food, it also used as lubricant oilcake for animal food.

848. Consider the following statements: (1) cucurbits are monoecious plant (2) in mango, neuter, male and female flowers occur together (3) leguminous plants show unisexuality (4) oblique septa is found in Rosaceae
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 1, 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2006

Ans. (b) : Cucurbits are monoecious, (both male and female flowers are present on the same plants). In mango, neutral, male and female flowers occur together. Leguminous plants have bisexual flower that is both stamens and carpels are present in same flowers. Oblique septa is found in solanaceae family.

849. Which one of the following plants is used in paint and varnish industry?
(a) Abies
(b) *Cedrus deodara*
(c) *Pinus roxburghii*
(d) *Pinus gerardiana*

AMU-1995

Ans. (c) : *Pinus roxburghii* plants is used in paint and varnish industry. It is commonly known as chir pine or longleaf Indian pine which is a species of pine tree native to the Himalayas. It was name after William Roxburgh.

850. *Simmondsia chinensis* is an oil yielding plant of Mexico and it has been recently introduced in Indian dessert. What is the common name of this plant?
(a) subabul (b) gauynie
(c) winged bean (d) Jojoba

AMU-1995

Ans. (d) : *Simmondsia chinensis* is an oil yielding plant of Mexico and it has been recently introduced in Indian desert which is commonly known as Jojoba.

851. Which one of the following plant is most commonly used as green manure?
(a) *Dalbergia sissoo*
(b) Polyaithea
(c) *Sesbania aculeate*
(d) none of these.

AMU-1995

Ans. (c) : Sesbania is a legume commonly used as a green manure crop to add nitrogen & organic matter to the soil.

- The most common species of Sesbania used in Asia are *Sesbania cannabina* (former name aculeate).

852. Pollinium is found in family
(a) asclepidaceae (b) rubiaceae
(c) solanaceae
(d) myrtaceae

AIIMS-1995

Ans. (a) : The pollen grains are found in a sac - like structure called pollinium. It is found in family - Asclepiadaceae and orchidaceae family two pollinia are attrached to a glandular adhesive disc called corpusculum are called retina culum.

853. The 3 sub-families of leguminosae are distinguished mainly on the basis of
(a) nature and habit of the plants
(b) nature of gynoecium
(c) nature of fruit and its germination
(d) inflorescence and lower characters

AIIMS-1995

Ans. (d) : The 3 sub-families of leguminosae are distinguished mainly on the basis of inflorescence and lower characters.

854. Black wood is obtained from
(a) Dalbergia (b) Albizzia
(c) Manihot (d) Acacia

AIIMS-1995

Ans. (a) : Black wood is obtained from Dalbergia.

- Black wood is a hardwood. The timber of black wood can be used to make furniture, panels, and decorative pieces.

855. Spirocyclic (hemicyclic) numerous free stamens and apocarpous carpels are found in the family
(a) Cucurbitaceae (b) Cruciferae
(c) Ranunculaceae (d) Labiatae

AIIMS-1998

Ans. (c) : Spirocyclic flower is also known as 'Hemicyclic' having flowering parts such as stamens and carpels are arranged spirally in Ranunculaceae.

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856. How many plants among Indigofera, Sesbania, Salvia, Allium, Aloe, Mustard, Groundnut, Radish, Gram and Turnip have stamens with different lengths in their flowers?

(a) Three (b) Five
(c) Four (d) Six

NEET-2016 Phase-II

Ans. (c) : Salvia, Mustard, Radish and Turnip plants have stamens of different length in their flowers. It has been found that the family Brassicaceae and Lamiaceae have distinct stamen length.

857. $\oplus$ ⚥ $K_{(5)}$ $C_{(5)}$ A_5 $G_{(2)}$ is the floral formula of

(a) Sesbania (b) Petunia
(c) Brassica (d) Allium

AIPMT-2015

Ans. (b) : The given floral formula is of family Solanaceae. Among the given options - only Petunia belongs to Solanaceae family, but other options such as-

- Allium is a member of Liliaceae family.
- Brassica is a member of family Brassicaceae family.
- Sesbania is a member of family Leguminosae.

858. From which part of coconut coir is obtained?

(a) Pericarp (b) Mesocarp
(c) Epicarp (d) Endocarp

UP CPMT-2009

Ans. (b) : Mesocarp is found from coconut coir. Coir is the fibrous material found between the hard, internal shell & outer coat of coconut called mesocarp.

859. Most of the economically important fibre yielding plants belong to family

(a) Malvaceae (b) Solanaceae
(c) Cruciferae (d) Poaceae

UP CPMT-2007

Ans. (a) : Malvaceae is a mallow family.
Example cotton, ladyfinger etc.

- It is the most important fiber plant which supply more than 70% of the world consumption of fibers.
- This family is used for obtaining cortical fiber which is used for cordage, ropes & floor covering.

860. Cocoa is the plant from which chocolate is made. Which part is used to extract it?

(a) Flower (b) Fruit
(c) Seeds (d) Bark

AIIMS-2007

Ans. (c) : Cocoa is obtained from seeds of cocoa plant theobroma. It belongs to family sterculiaceae. This plant is a native of tropical America and its seeds are used to prepare cocoa and chocolate.

861. Identify the plants in correct sequence, which exhibit marcescent calyx, herkogamy, mucilagenous cavities and inferior ovary respectively.

i. Sphaeranthus ii. Capsicum
iii. Gloriosa iv. Kydia

The correct sequence is

(a) i, iii, ii, iv (b) ii, i, iii, iv
(c) ii, iii, i, iv (d) ii, iii, iv, i

AP EAMCET-2008

Ans. (d) : Capsicum- It is genus of flowering plants in the nightshade family **solanaceae** native to the America,cultivated worldwide for their chilli pepper or bell pepper fruit.

Gloriosa- *Gloriosa superba* is a species of flowering plant in the family **Colchicaceae**. Common names include **flame lily.**

Kydia-*Kydia calycina* is a species of flowering plants in the genus kydia found in the Indian subcontinent, Southern China and south east Asia.

Sphaeranthus - It is a genus of Asian, Africans and Australian plants, in the inuleae tribe within the daisy family.

862. Identify three of the following plants, which exhibit the physiological process described to 'Necessary Evil'

i. Potamogeton ii. Sagittaria
iii. Limnophila iv. Nymphaea

The correct match is

(a) i, ii, iii (b) ii, iii, iv
(c) i, ii, iv (d) i, iii, iv

AP EAMCET-2008

Ans. (b) : Sagittaria- It is a genus of aquatic plants Mostliy are native to South, Central and North America

(a) **Potamogeton-** It is a genus of aquatic-mostly freshwater, plants of the family **potamogeonaceae.**

(c) **Limnophila** - It is a genus of flowering plants in the family **Plantaginaceae**. It is distributed in tropical and sub-tropics region of Africa' Asia, Australia, and the Pacific islands species are known commonly as **marshweeds**. These are annual or perennial herbs.

(d) **Nymphaea-** It is a genus of **hardy and tender** aquatic plants in the family **Nymphaeaceae.** The genus has a cosmopolitan distribution. Some taxa occur as introduced species where they are not native and some are weeds. It's also known as **Water lily.**

863. Study the following lists

List-I	List-II
(A) Arachis	**1. Basket making**
(B) Mangifera	**2. Saky**
(C) Cajanus	**3. Fixed oil**
(D) Oryza	**4. Diuretic**
	5. Nitrocellulose

	A	B	C	D
(a)	3	4	1	2
(b)	2	3	4	5
(c)	3	1	5	4
(d)	5	3	2	1

AP EAMCET-2008

Ans. (a) :

(a) Arachis - Fixed oil
(b) Mangifera - Diuretic
(c) Cajanus - Basket making
(d) Oryza - Saky

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864. In the flowers of a plant, the ovarian part is fused, but styles and stigmas are free. Its ovary becomes unilocular due to breakdown of partition wall and the ovules are attached to a central axis. Identify the plant.

(a) Dianthus (b) Abutilon
(c) Nymphaea (d) Michelia

AP EAMCET-2008

Ans. (a) : Dianthus-It is a genus of the family **Caryophyllaceae,** native mainly to Europe and Asia,

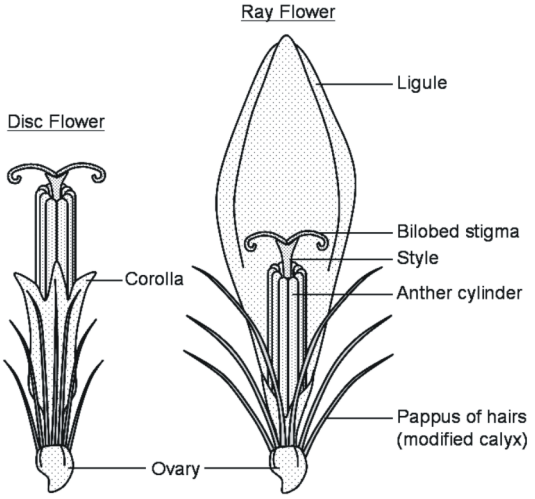
- **Abutilon,** also known as **Indian mallow,** is large genus of flowering plants in the **mallow** family
- **Nymphaea,** also known as **''Water lily''** is a genus of hardy and tender aquatic plants in the family **Nymphaeaceae**.The genus has a cosmopolitan distribution. Many species are cultivated as ornamental plants.
- **Michelia** is a historical genus of flowering plants belong to the **Magnolia family**. The genus included about 50 species of evergreen trees and shrubs, native to tropical and subtropical South and Southeast Asia, including Southern China . Today it is regarded as a synonym of magnolia.

865. Pappus helps in dispersal of pollen in?

(a) Asteraceae (b) Brassicaceae
(c) Malvaceae (d) Solanaceae

AIIMS-2011
J&K CET - 2000

Ans. (a) : Pappus is found in the plant belonging to the family of Asteraceae. The pappus may be formed of bristles or scales. These hairy structure help in dispersal of pollen by wind. This makes the seed light which help in easy dispersal by the wind.



866. Which one of the following is correct matching of a plant, its habit and the forest type where it normally occurs ?

(a) Prosopis- Tree-scrub
(b) Saccharum- Grass-forest
(c) *Shorea robusta*- Herb - Tropical rain forest
(d) *Acacia catechu*- Tree - Coniferous forest.

AIIMS-2005

Ans. (a) : Prosopis trees are present in the family of **Fabaceae.** They are evergreen plant.

- Prosopis is a deep-rooted perennial tree, which is able to absorb water from either water table or moist strata. It is found in desert shrub forests.
- **Saccharum** is common grass found in grasslands and tropical savannah. Both *Shorea robusta* and *Acacia catechu* are trees found in tropical deciduous forests. In tropical deciduous forests, vegetation includes broad-leave trees, which shed their leaves during the dry season.

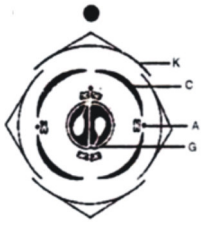
867. The family containing mustard and its main characters are

(a) Brassicaceae – Tetramerous flowers, six stamens, bicarpellary gynoecium, siliqua type fruit
(b) Brassicaceae – Pentamerous flowers, many stamens, pentacarpellary gynoecium, capsule type fruit
(c) Solanaceae – Pentamerous flowers, five stamens, bicarpellary gynoecium, berry type fruit
(d) Poaceae – Trimerous flowers, three stamens, monocarpellary gynoecium, caryopsis type of fruit

AIIMS-2005

Ans. (a) : Mustard, condiment made from the pungent seeds of either of two main herbs belong to the family **Brassicaceae**. The principal types are white or yellow, mustard (*Sinapis alba*), a plant of Mediterranean origin; and brown, or Indian mustard **(*Brassica juncea*)** which is of Himalayan origin. Diagnostic features Herbaceous, exstipulate, alternate leaves.

- **Inflorescence** typical racemose type.
- **Flowers-** Tetramerous.
- **Ovary -** Syncarpous.
- **Placentation-** Parietal placentation.
- **Fruit-** Siliqua or silicula.



FLORAL DIAGRAM

868. Censar mechanism of seed dispersal is found in

(a) Papaveraceae (b) Liliaceae
(c) Leguminosae (d) Rosaceae

AIIMS-2014

Ans. (a) Whenever the fruit is shaken forcefully with the help of wind, the seeds come out in small aggregates and this mechanism is called censor mechanism.

- **Censer mechanism** is seen in papaveraceae family
- the fruit splits however the force is simply too low to disperse or scatter the seeds.

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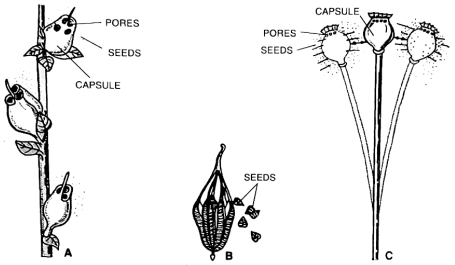
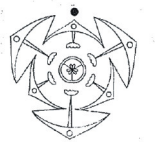
- Zoochory involving beetles and ants is seen within the seed dispersal of lily family (Liliaceae).
- In Rosaceae seed dispersal happens by endozoochory. Seed dispersal mechanism through ingestion by vertebrate animals, mostly birds and mammals is known as **endozoochory**.



Censer mechanism: A–*Antirrhinum*; B–*Aristolochia*; C–Poppy.

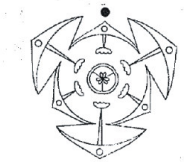
869. Plants having the below given floral diagram are:



(a) leguminous
(b) dicots
(c) medicinal and perennial
(d) having pinnately compound leaves

AIIMS-2012

Ans. (c) :



$\oplus\ \delta\ P_{3+3}\ A_{3+3}\ \underline{G}_{(3)}$

Floral diagram with floral formula

The given floral diagram is of Liliaceae family. Liliaceae is the family of around 2500 species of perennial, herbaceous monocots. It is also known as the Lily family. Most plants of this family are good ornaments (Lilium, Tulips, Glorisoa etc.), source of medicine (Aloevera, Smilax etc.), vegetables.

870. Pulses are obtained from

(a) Fabaceae (b) Asteraceae
(c) Poaceae (d) Solanaceae

AIPMT-1993

Ans. (a) : A pulse is the edible seed from a legume plant. Pulses include beans, lentils and peas. The fabaceae or Leguminosae is commonly known as legume, pea or bean family. Pulses are economically as well as nutritionally very important for human beings

871. Epipetalous stamens with free filaments and fused anthers occur in

(a) Asteraceae (b) Solanaceae
(c) Liliaceae (d) Poaceae

AIPMT-1992, 1991

Ans. (a) : Epipetalous stamens with free filaments and fused anthers occur in asteraceae. Anthers are united together to form a tube like structure the filaments remain free so syngenesious conditions are also present. These two type of conditions are found in the family Asteraceae.

872. Floral formula of tomato/tobacco is

(a) $\oplus\ \delta\ \varphi\ K_{4-5}A_{10}G_{(2)}$ (b) $\oplus\ \delta\ \varphi\ K_{2+2}C_4A_{2+4}G_1$
(c) $\oplus\ \delta\ \varphi\ P_2A_3G_1$ (d) $\oplus\ \delta\ \varphi\ K_{(5)}\overset{\frown}{C_{(5)}}A_5\underline{G}_{(2)}$

AIPMT-1992, 1989

Ans. (d) :

The floral formula of tomato is - $\oplus\ \delta\ \varphi\ K_{(5)}\overset{\frown}{C_{(5)}}A_5\underline{G}_{(2)}$. It is belong to solanaceae family. Solanaceae has some identifying characteristics – actinomorphic bisexual, bicarpellary, syncarpous superior ovary, axial placentation.

873. Syngenesious condition is found in

(a) Asteraceae (b) Labiatae
(c) Solanaceae (d) Fabaceae

AIPMT-1991

Ans. (a) : In family Asteraceae, anthers are syngenesious in this condition the stamens are united by their anthers only filaments free.

874. A characteristic feature of ovary of *Brassica campestris* is :

(a) presence of replum (b) axile placentation
(c) epigynous (d) multilocular nature

Punjab MET-2006

Ans. (a) : In Brassica the ovary is unilocular in the beginning but it becomes bilocular due to the formation of a false septum (Replum). Replum is the false septum.

875. Reserpine is obtained from :

(a) Asafoetida
(b) *Rauwolfia serpentina*
(c) *Curcuma longa*
(d) *Papaver somniferum*

Punjab MET-2006

Ans. (b) : *Rauwolfia serpentine* root bark contains the alkaloid reserpine.

• It is an antiphychatic and antihypertensive indole alkaloid. It is used to treat acute agitation in those who have mental illneses and also used to treat high blood pressure.

876. Verticillaster inflorescence is the characteristic of family:

(a) Cucurbitaceae (b) Rubiaceae
(c) Labiatae (d) Asteraceae

JCECE-2002

Ans. (c) : Verticillaster is a special type of inflorescence seen is Basil and leucas. Verticillaster refers to a fascicle with the structure of a dichasium. It is a common feature among the members of the labiatae (Lamiaceae) family.

877. *Rauwolfia serpentine* is used in:

(a) curing high blood pressure
(b) kidney failure
(c) eye defect
(d) diabetes

JCECE-2006

@apna_pdf

Ans. (a) : *Rauwolfia serpentine* root bark contains the alkaloid reserpine. Roudixin, serpalan and serpasil are some of the commercial names for it.

• It is an antiphychatic and antihypertensive indole alkaloid. It is used to treat acute agitation in those who have mental illneses and also used to treat high blood pressure.

878. Placentation in Brassicaceae is:

(a) parietal (b) marginal
(c) axile (d) basal

JCECE-2006

Ans. (a) : Brassicaceae is the family of Angiosperms that includes species such as *Raphanus sativus* (Radish), *Brassica oleracea* (cabbage).

• The flowers is tetradynamous, Actinomorphic with four saccate sepals, four petals, superior ovary and a single bilocular pistil with parietal placentation.

879. The anthers in family-Solanaceae

(a) introse, monothecus
(b) extrose, dithecus
(c) introse, dithecus
(d) extrose, monothecus

BVP-2014

Ans. (c) : The anthers of plants in the solanaceae family are generally dithecous and dehysis are in the introse mode.

880. The origin centre of potato is

(a) Mexico (b) Panama
(c) Brazil (d) Peru

BVP-2014

Ans. (d) : The oldest archeologically verified remains of potato tubers have been found at the coastal site of Ancon (Central Peru) of 2500BC.

881. Turpentine oil, a ingredient in paint and varnishes is obtained from

(a) *Melia azadirachta* (b) *Pinus longifolia*
(c) Eucalyptus (d) Cedrus

BVP-2014

Ans. (b) : *Pinus longifolia* is one of the pine tree from which turpentine is obtained. It belong to the pinaceae family of gymnosperms.

882. The characteristic inflorescence features of family-Moraceae and poaceae are

(a) racemose and hypanthodium
(b) spike and spike of spikelet
(c) hypanthodium and spadix
(d) hypanthodium and spike of spikelet

BVP-2014

Ans. (d) : Moraceae → The infloresence is axillary are variable in morphology including spike **(catkin like in Morus)**, raceme, head (in some taxa with flowers borne upon the surface of an invaginated compound receptacle), or in ficus an enclosed hypanthodium.

Poaceae (Gramineae) :-
The inflorescence of grasses is the spikelet, a small structure consisting of a short axis, the rachilla, to which are attached chaffy, two - ranked, closely overlapping scales.

883. The botanical name of cabbage is:

(a) *Brassica oleracea* var. botrytis
(b) *Brassica oleracea* var. capitata
(c) *Brassica oleracea* var. gongylodes
(d) *Brassica compestris*

AFMC-2003

Ans. (b) : *Brassica oleracea* includes cabbage, cauliflower, broccoli etc. of them belong to the family brassicaeae family. so, the botanical name of cabbage is - *Brassica oleracea* var. capitata. *Brassica oleracea* var. botrytis is a botanical name of cauliflower.

884. Which of the following is a fatty oil yielding plant?

(a) Sunflower (b) Acacia
(c) Butea (d) Casuarina

AFMC-2003

Ans. (a) : Sunflower (*Helianthus annus*) is a fatty oil yielding plant. The seeds of this flower are the main source of oil. There are various type of fatty acids in this oil which can be used to reduce the risk of cardiovascular (heart) diseases.

885. Swollen and spongy petioles are characteristic of–

(a) Trapa (b) Wolffia
(c) Ceratophyllum (d) Limnophila

Uttarakhand PMT-2010

Ans. (a) : Air filled swallen and spongy petioles of leaf stalks provides buoyancy to the water hyacinth.
Aerenchyma helps in buoyancy as well as in the respiration of aquatic plants.
Example:- Trapa, Eichhornia.

886. A plant with low CO_2 compensation point is–

(a) *Atriplex patula*
(b) *Leucopoa kingu*
(c) *Gossypium hirsutum*
(d) *Tidestromia oblongifolia*

Uttarakhand PMT-2010

Ans. (d) : In C_4 plants, the compensation point is lower due to the high affinity of enzyme PEP - Carboxylase .
Example: - *Tidestromia oblongifolia*

887. The characteristic fruit type in Asteraceae is

(a) carcerulus (b) capsule
(c) cypsela (d) caryopsis

Uttarakhand PMT-2010

Ans. (c) : Cypsela is a characteristic fruit of family asteraceae. It is dry single seeded fruit formed from double ovary of which only one develops into a seed.

• Cypsella is a dry fruit which develop from single carpel inferior ovary. Cypsella seed is attached to the fruit wall only at one point

888. Which of the following has thorns bearing leaves and flowers on them?

(a) Duranta (b) Artabotrys
(c) Carissa (d) Bougainvillea

Uttarakhand PMT-2010

Ans. (a) : The thorn is a hard straight and pointed structure. The thorn sometimes bears leaves, flowers and fruits as seen in Duranta.

• The thorn not only check the rate of transpiration but also protect the plant from herbivorus animals.

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889. Which of the following pairs of families possess pollinia ?
(a) Orchidaceae and Apocynaceae
(b) Orchidaceae and Asclepiadaceae
(c) Asclepiadaceae and Mimosaceae
(d) Asclepiadaceae and Apocynaceae

Punjab MET-2007

Ans. (b) : Pollinia is a cluster of pollen grains formed on each lobe of anther & transferred as a single mass for pollination.
• Family possess pollinia are - Asclepiadaceae & Orchidaceae.

890. Epigynous flowers with numerous stamens are found in
(a) *Ranunculus muricatus*
(b) *Fragaria indica*
(c) *Croton roxburghii*
(d) *Syzygium cuminis*

Punjab MET-2007

Ans. (d) : *Syzygium cuminis* (Jamun) family - Myrtaceae, which possess epigynous flower with numerous stamens.

891. A commonly used mastigator called supari is obtained from the plant
(a) *Acacia catechu* (b) *Areca catechu*
(c) *Piper betel* (d) None of these

Punjab MET-2007

Ans. (b) : The betel nuts of the areca nut are called supari. •They are similar to the palm plants, they belong to the arecaceae or palmaceae family.
• It is obtained from the plant - *Areca catechu*

892. The aquatic weed which is popularly called terror of Bengal is
(a) Erythroxylum (b) Eichhorniaa
(c) Echinus (d) Echidna

AP EAMCET-2016

Ans. (b) : *Eichhornia crassipes* (Water hyacinth) is called the terror of Bengal.
• It is an exotic species. It grow very fast & competed with the native species for survival.

893. From the options given below, find out the correct floral formula for a flower having the following characters namely actinomorphic, bisexual, five united sepals, five united petals, stamens five and epipetalous, bicarpellary, syncarpous with superior ovary :

(a) ⊕ ♀ K(5) C(5)A5 $\underline{G}$(2)

(b) ⊕ ♀ K(5) $\overline{C(5)A5}$ $\underline{G}$(2)

(c) ⊕ ♀ K(5) C(5)A5 $\underline{G}$(2)

(d) ⊕ ♀ K(5) $\overline{C(5)A5}$ $\bar{G}$(2)

(e) ⊕ ♀ K(5) C(5)A5 $\bar{G}$(2)

Kerala PMT-2011

Ans. (b) : Flower → Actinomorphic, bisexual,
Calyx → five united sepals
Corolla → five united petals
Androecium → stamen five epipetalous
Gynoecium → Bicarpellary, syncarpous, with superior ovary.

⊕ ♀ $K_{(5)}$ $\overset{\frown}{C_{(5)}A_5}$ $\underline{G}_{(2)}$

894. Select the correctly matched pair :

(a)	Colchicum autumnale	Solanaceae
(b)	Petunia	Solanaceae
(c)	Gloriosa	Fabaceae
(d)	Trifolium	Liliaceae
(e)	Sesbania	Solanaceae

Kerala PMT-2011

Ans. (b) :
(a) Colchicum autumnale - Colchieaceae
(b) Petunia - Solanaceae
(c) Gloriosa - Colchicaceae
(d) Trifolium - Leguminaceae
(e) Sesbania - Fabaceae (Leguminaceae)

895. This is an insectivorous plant:
(a) Opuntia (b) Eichhornia
(c) Utricularia (d) Crotalaria

Karnataka CET-2001

Ans. (c) : Insectivorous plants are mainly grow in Na deficient soil.
Insectivorous plants are the plant that consume insects to nutritional requirement.
• Few Examples of insectivorous plants are Utricularia (Bladderwort), Pitcher Plant, Venus flytrap etc.

896. Seeds of *Brassica compestris* provide:
(a) oil and oil cake (b) medicines
(c) oil (d) none of these

JIPMER-1996

Ans. (a) : Seeds of *Brassica compestris* provide rapeseed oil which is a vegetable oil derived from the seeds of the rapeseed plant. It provide edible oil & oil cake used as fodder.

897. Botanical name of tea is
(a) *Piper nigrum* (b) *Camellia sinensis*
(c) *Coffea arabica* (d) *Tectona grandis*

CG PMT-2005

Ans. (b) :

Botanical name	**Plants**
(1) *Piper nigrum*	Black pepper
(2) *Camellia sinensis*	Tea plant
(3) *Coffea arabica*	Coffee
(4) *Tectona grandis*	Teak

898. What is the order of Tulsi ?
(a) Lamiaceae (b) Lamiales
(c) Poales (d) Sapindales

BCECE-2015

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Ans. (b) : Tulsi belongs to the angiosperm family of the lamiaceae. The order of Tulsi (*Ocimum sanctum*) is lamiales. Tulsi is cultivated for religious and traditional medicine purposes and for its volatile oil.

899. Long fibres of cotton seed are known as

(a) coir (b) fuzz
(c) lint (d) flax

WB JEE-2007

Ans. (c) : Cotton is the most important fiber plant in the world.

- The fibers are actually hair that grow out of the seed coats. Some epidermal cells make long lint hairs.
- Other cells stop growing before they become too long, we call these fuzz hairs.

900. *Carthamus tinctorius* belongs to family

(a) Asteraceae (b) Solanaceae
(c) Malvaceae (d) Fabaceae

WB JEE-2007

Ans. (a) : *Carthamus tinctorius* (Safflower) is highly branded, herbaceous, thistle – like annual plant in the family – Asteraceae.

901. Match the following column I with column II.

	Column I		Column II
A.	Sago	1.	*Urgenia martini*
B.	Turpentine oil	2.	*Gossypium hirsutum*
C.	Rat poison	3.	Pinus
D.	Cotton fibre	4.	Extract of lichens
E.	Litmas paper	5.	*Cycas revoluta*

Codes

(a) A-1 B-2 C-3 D-4 E-5
(b) A-5 B-3 C-1 D-2 E-4
(c) A-3 B-2 C-4 D-1 E-5
(d) A-4 B-5 C-3 D-2 E-1
(e) A-4 B-2 C-5 D-3 E-1

CMC Vellore-2015

Ans. (b) : (A). Sago – *Cycas revoluta* popularly known as sago palm.

(B). Turpentine oil – Turpentine is a well known essential oil extracted by distillation from Pine.

(C). Rat poison – Rat poison is called Rodenticide. The most common rodenticides includes red squill and ANTU (Alpha Naphthyl Thiourea). Red squill is obtained from a plant *Urgenia martini* in the powder form.

(D) Cotton fibre – *Gossypium hirsutum* is the scientific name of cotton which belongs to family Malvaceae. These are also known as upland cotton or Mexican cotton.

(E) Litmus paper – It is obtained from organisms called Lichens. Lichens are symbiotic associations of Algae & fungi.

902. Choose the correct option depicting the floral formula of the diagram given below.

(a) Br ⊕ ⚥ $P_{3+3}\ A_{3+3}\ \underline{G}_{(3)}$

(b) Br ⊕ ⚥ $Epi_{5-7}\ k_{(5)}\ C_5A_{(\infty)}\underline{G}_{(5)}$

(c) Ebr ⊕ ⚥ $K_{2+2}\ C_4\ A_{2+4}\ \underline{G}_{(2)}$

(d) % ⊕ ⚥ $K_5\ C_5A_{7+3}\ \underline{G}_{(1)}$

MGIMS Wardha-2015

Ans. (b) : Br ⊕ ⚥ $Epi_{5-7}\ k_{(5)}\ C_5A_{(\infty)}\underline{G}_{(5)}$

Inflorescence – Solitary axillary or terminal.

Flower – Bracteate, bracteolate, pedicellate, complete, hermaphrodite (Bisexual), actinomorphic, pentamerous & hypogynous,

Epicalyx – An involucre of bracteoles which forms the epicalyx. Epicalyx has 3 to many.

Calyx – Usually five, free or connate sepals which shows valvate aestivation in bud.

Corolla – 5 petals, free or basally connate with the staminal column as in Hibiscus. It shows twisted aestivation.

Androecium- It consist numerous monadelphous stamens.

Gynoecium – 5 in number, superior ovary

Fruit – Fruit is a loculicidal capsule.

Seeds – Seeds are obovoid with a scanty endosperm.

903. The plants which have antidiabetic properties

(a) Ocimum sanctum (b) Gymnema sylvestre
(c) Adathoda vasica (d) Phyllantus emblica

Karnataka CET-2013

Ans. (b) : *Gymnema sylvestre* (Gurmar) helps lower Blood sugar levels.

It reduces sugar cravings by making sweet foods tasteless appealing.

It is regarded as one of the plants with potent antidiabetic properties.

904. The Flora formula ⊕ ⚥ $K_{(5)}\ C_{(5)}\ A_5\ \underline{G}_2$ **is that of**

(a) Hibiscus (b) Banana
(c) Tulip (d) Vinca

Karnataka CET-2013

Ans. (d) :

⊕ ⚥ $K_{(5)}\ C_{(5)}\ A_5\ \underline{G}_2$

Catharanthus roseus – (Vinca or Sadabahar)

(1) Infloresence – Axillary or terminal cymose flora are solitary.

(2) Flower - Bracteate, bractiolate, hermaphrodite actinomorphic, pentamerous.

@apna_pdf

(3) Calyx – gamosepalous, five lobed.
(4) Corolla – Gamopetalous, five lobed.
(5) Androecium – Epipetalous, dithecous.
(6) Gynoecium – Bicarpellary with superior ovary.

905. Compositae is also called:
(a) Asteraceae (b) Myrtaceae
(c) Fabaceae (d) Zingiberaceae
DUMET-2002

Ans. (a) : Compasitae is also called Asteraceae.
Special features -
- Infloreescence head or capitulum or Racemose
- Ray florate and disc flarate
- Calyx modified into pappus
- Stamen syngenesious, epipetalous inferior ovary with basal placentation.

Distribution - Largest family of the Angiosperm, near about 950 genera and 13000 species, cosmopolition in distribution.

906. A plant species which has been exploited for the production of Hirudin is
(a) *Brassica napus* (b) *Zea mays*
(c) *Solanun nigrum* (d) *Oryza sativa*
DUMET-2011

Ans. (a) : *Brassica napus* – Hirudin is a protein that prevents blood clotting. The gene encoding it has been synthesized chemically & transferred into *Brassica napus*. It is then extracted and purified to be used as a medicine.

907. Oblique ovary is found in family :
(a) brassicaceae (b) compositae
(c) leguminosae (d) solanaceae
DUMET-2004

Ans. (d) : In solanaceae - Androecium polyandrous, epipetalous basifixed, anther dithecous introrse and Gynoecium – bicarpellary, bilocular but multilocular due to the formation of false septum e.g. - Tomato.
Swollen Placenta, **oblique septum, carpals arranged at 45° angle, ovary** superior with axile placentation**.**

908. Botanical name of tea is:
(a) *Camellia sinensis* (b) *Coffea arabica*
(c) *Theobroma cacao* (d) None of these
Rajasthan PMT-1997

Ans. (a) : The botanical name of tea is *Camellia sinensis*. Blongs to family Theaceae
Coffea arabica is common name of coffee
Theobroma cacao is common name of cocoa.

909. Gossypium sp. (cotton) concerned with family:
(a) Malvaceae (b) Solanaceae
(c) Cruciferae (d) Compositae
Rajasthan PMT-1997

Ans. (a) : Gossypium is a genus of flowering plants in the tribe Gossypieae of the mallow family – Malvaceae from which cotton is harvested.

910. The floral formula of Solanaceae family is:
(a) $K_{(5)}C\overset{\frown}{_{(5)}}A_{(5)}G_{\underline{(2)}}$ (b) $P_3K_5C_5A_3G_{(2)}$
(c) $P_3K_3A_3G_{(3)}$ (d) None of the above
Rajasthan PMT-1997

Ans. (a) : The floral formula of solanaceae is-
$K_{(5)}C\overset{\frown}{_{(5)}}A_{(5)}G_{\underline{(2)}}$
Calyx – Five lobed and usually persistent.
Corolla – Gamopetalous, five lobed.
Androecium – Usually five, polyandrous & epipetalous
Gynoecium – Bicarpellary & syncarpous Ovary is superior & bilocular with axile placentation.

911. Edible part of Cauliflower is:
(a) inflorescence (b) flower
(c) leaf (d) stem
Rajasthan PMT-1997

Ans. (a) : Edible part of cauliflower is inflorescence which we used as a vegetable belongs to family Brassicaceae (cruciferae).

912. Which of the following is not represent an aquatic plant?
(a) Eichhornia (b) Wolffia
(c) Nepenthes (d) Vallisnaria
Rajasthan PMT-1997

Ans. (c) : Nepenthes is also called tropical pitcher plant. It is terrestrial plant.
- Aquatic plants are supported by their buoyancy in water & do not need a regid stem. Nepenthes is a insectivorous plant which grows in Na deficient soil. It consume nitrogen from the insect

913. *Atropa belladonna* is the member of family:
(a) Liliaceae (b) Solanaceae
(c) Malvaceae (d) Cucurbitaceae
Rajasthan PMT-1997, 1999

Ans. (b) : *Atropa belladona* also called deadly nightshade, tall, bushy herbs of the nightshade family (solanaceae),
- Atropin alkaloid extract from root of Belladonna used in dilate pupil of eye.

914. The number of stamens present in Cruciferae family are:
(a) 4 (b) 7
(c) 2 (d) 6
Rajasthan PMT-1997

Ans. (d) : In the family Brassicaceae (Cruciferae).
6 stamen (2+4), 2 outer short antisepalous and 4 inner long antisepalous thus Tetradynamous condition. which are the characteristic feature of Brassicaceae family,

915. A nutrient not required / has no function in plants except in Fabaceae, but essential nutrient of animals whose deficiency makes a person anemic as it is an integral part of vitamin B-12; and this nutrient is:
(a) Iron (b) Calcium
(c) Cobalt (d) Cadmium
MP PMT-2013

Ans. (c) : • Vitamin B_{12} contains the mineral cobalt, compound with vitamin B_{12} activity are collectively called 'Cobalamins'.
- Vitamin B_{12} also known as cobalamin, comprises a number of forms including cyano methyl, deoxyadenosyl (coenzyme B_{12}) and hydroxy – cobalamin.
- The mineral cobalt is an essential part of the B_{12}.

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916. Seed dispersal by parachute type mechanism is found in:
(a) Pea of Fabaceae
(b) Mustard of Brassicaceae
(c) Cotton of Malvaceae
(d) Taraxacum of Asteraceae

MP PMT-2013

Ans. (d) : Parachute mechanism of fruit and seed dispersal is due to a structure called pappus. Pappus is the calyx.
Parachute mechanism the appendages develops in fruits and seed, which act as parachute. Various part are modified as-
Pappus in several members of family compositae like Tagetus (marigold), Taraxacum etc.
Calyx are modified into cluster of hairs called pappus which acts as parachute.

917. The association of ants and the members of the family Rubiaceae is known as:
(a) Ornithophily (b) Entomophily
(c) Myrmecophily (d) Anemophily

MP PMT-2013

Ans. (c) : The association between ants and the member of the family Rubiaceae is known as Myrmecophily.
• Myrmecophily is the symbiotic relationship of ants and plants in which the ants get food & place to stay while plants get a pollinator or a method of seed dispersal. It is widely used by family Rubiaceae.

918. Which pair for plants placed in the family-Solanaceae?
(a) Datura and Petunia
(b) Datura and Asphodelus
(c) Petunia and Sesbania
(d) Petunia and Pisum

AMU-2014

Ans. (a) : Family Solanaceae is commonly called as potato family. It is widely distributed in tropical, subtropical & even temperate zones.
• Plant belongs to the family are tomato, brinjal, potato, chilli. Datura (belladonna), Ashwagandha, tobacco & Pitunia etc.

919. The following is a non-succulent xerophytes having thick leathery leaves with white sticky waxy coating:
(a) Nerium (b) Calotropis
(c) Bryophyllum (d) Ruscus

AP EAMCET-1998

Ans. (b) : Calotropis has waxy coating on their thick leaves. It has milky latex. Calotropis is a non-succulent xerophytic plant belongs to the family Apocynaceae.

920. Transversely arranged carpels are found in:
(a) Solanum (b) Tridax
(c) Brassica (d) Allium

AP EAMCET-1998

Ans. (b) : Transversely arranged carpels are found is Tridax. Tridax is a genus of the family Asteraceae. Tridax is native primarily to the tropical regions of North and South America.
Tridax procumbens has been in use in India for wound healing and as an anticoagulant, antifungal, and insect repellent.

921. Nimbin and Nimbidin are got from:
(a) Emblica officinalis
(b) Cinchona officinalis
(c) Azadirachta indica
(d) Rauwolfia serpentina

AP EAMCET-1998

Ans. (c) : Nimbin and Nimbidin are got from Azadirachta indica (NEEM). Neem tree or Indian lilac, is a tree in the mahogany family Meliaceae. It is one of two species in the genus Azadirachta and is native to the Indian subcontinent and most of the countries in Africa.

922. Translator mechanism is found in:
(a) Arachis (b) Solanum
(c) Calotropis (d) Salvinia

AP EAMCET-1998

Ans. (c) : Calotropis has a characteristic feature i.e. presence of translators. Translator consists of a corpusculum and one or two pollinia.
Calotropis blonging to the family Apocynaceae. These plants are indigenous to North Africa and Southern Asia.

923. The scientific name of amla is:
(a) *Emblica officinalis* (b) *Phyllanthus niruri*
(c) *Musa paradisica* (d) *Tamarindus indica*

AP EAMCET-1998

Ans. (a) : The scientific name of amla is *Emblica officinalis Gaertn* or *Phyllanthus emblica Linn*, commonly known as Indian gooseberry or amla.
Amla belongs to the family phyllanthaceae its native range is tropical and Southern Asia.

924. In Agave Americana, bulbil is a modification of:
(a) terminal bud (b) vegetative bud
(c) cauline bud (d) floral bud

AP EAMCET-1998

Ans. (d) : The common method of vegetative propagation in ***Agave Americana*** is the formation of bulbils. These bulbils are modified from the floral buds.

925. Secondary rachis is modified as phyllode in:
(a) Parkinsonia (b) Casuarina
(c) Bryophyllum (d) Ruscus

AP EAMCET-1998

Ans. (a) : In Parkinsonia, the primary rachis and stipules modify into spines while the secondary rachis are modified into phyllodes. Phyllodes are flat, green-coloured leaf-like modifications of petioles or rachis.

926. Compound head is found is:
(a) Zinnia (b) Tagetus
(c) Echinops (d) Tridax

AP EAMCET-1998

Ans. (c) : Compound head is found is Echinops. Echinops is a genus of about 120 species of flowering plants in the family Asteraceae, commonly known as globe thistles. They have spiny foliage and produce blue or white spherical flower heads.

927. Tripinnate leaves are found in:
(a) Moringa (b) Acacia
(c) Oxalis (d) Gynandropsis

AP EAMCET-1998

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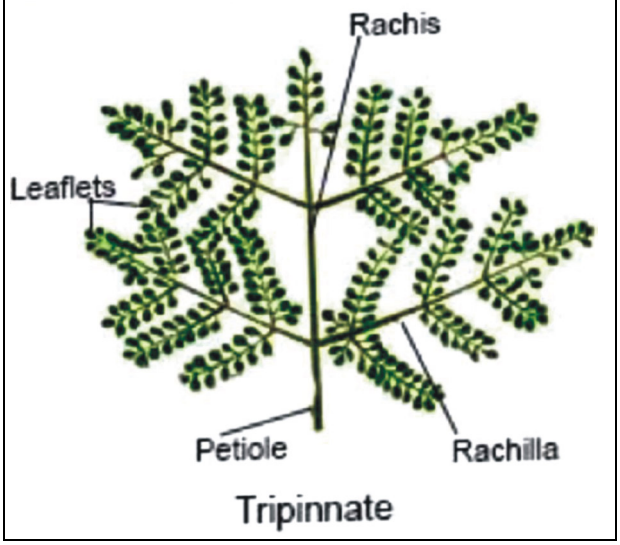
Ans. (a) : The term tripinnate means the pinnately compound leaves in which the leaflets are themselves bipinnate. Such an arrangement of the leaflets found in the drumstick tree i.e., *Moringa oleifera*



928. The spines in the following, represent the first leaf of the axillary branch:
(a) Citrus (b) Opuntia
(c) Ziziphus (d) Acacia
AP EAMCET-1998

Ans. (a) : In citrus plant, spines are present on the stem. These spines are the modification of the first leaf of axillary bud. Citrus in the family, Rutaceae. Citrus fruits for example - Oranges, Lemons, Pomelos and Limes.

929. In the following plant, male flower is represented by a single stamen:
(a) Ficus (b) Poinsettia
(c) Lenotis (d) Leucas
AP EAMCET-1998

Ans. (b) : Some members of Euphorbiaceae family like poinsettia and Euphorbia etc have the Cyathium inflorescence. In this special type of inflorescence, the male flower is represented only by a single stamen.

930. Buttress roots are found in:
(a) Sorghum (b) Banyan
(c) Terminalia (d) Pandanus
AP EAMCET-1998

Ans. (c) : Buttress root a stilt root, most commonly found in large, tropical trees, that emerges adventitiously from the trunk and is flattened, so it resembles an approximately triangular broad. This type of root provides the tree with mechanical support. Buttress roots are found in Terminalia, Salmalia, ficus and Borntoax etc.

931. In which of the following are orchreate stipules found ?
(a) Cruciferae (b) Papilionaceae
(c) Compositae (d) Polygonaceae
Punjab MET-2011

Ans. (d) : Ochreate stipules are found in polygonaceae family.
- Leaves of some plants have lateral parts on each side of leaf base known as stipules. Main function of stipules is to protect the leaf in the bud.
- Ochreate stipules are formed when both stipules of the leaf join on the outer & inner margin & make a hollow tube which surrounds the stem up to the upper part of node.

932. Inflorescence of Liliaceae is
(a) zygomorphic (b) trimerous
(c) pentamerous (d) imperfect
Punjab MET-2011

Ans. (b) : Inflorescence in liliaceae is generally variable ranging from solitary to cymose. It is often present as umbellate clusters.
- Flower of liliaceae family are trimerous. Perianth is present, stamens epipetalous, Gynoecium-tricarpellary syncarpous, superior ovary with axile placentation.

933. Family Lilliaceae is characterized by :
(a) trimerous flower (b) tetramerous flower
(c) pentamerous flower (d) zygomorphic flower
Rajasthan PMT-2002

Ans. (a) : Family Liliaceae are characterized as complete, bisexual, bracteate, trimerous actinomorphic, hypogynous flower.
Perianth is present, stamens epipetalous, Gynoecium-tricarpellary suncarpous, superior ovary with axile placentation.

934. A characteristic feature of ovary of *Brassica campestris* is :
(a) presence of replum (b) axile placentation
(c) epigynous (d) multilocular nature
J& K CET - 2006
Rajasthan PMT-2002

Ans. (a) : Brassica belongs to family Brassicaceae (Cruciferae).
In brassica- Gynoecium bicarpellary, Syncarpous, unilocular in the beginning but due to the formation of false septum (replum) ovary becomes bilocular superior with parietal placentation.

935. Reserpine is obtained from:
(a) Asafoetida
(b) Rauwolfia serpentine
(c) Curcuma longa
(d) Papaver somniferum
Rajasthan PMT-2002

Ans. (b) : Reserpine is an indole alkaloid obtained from *Rauwolfia serpentine* belongs to family Apocynaceae.
- It is used as antipsychotic and antihypertensive agent for the control of high blood pressure and for the relief of psychotic symptoms respectively.

936. The characteristics of family Malvaceae is :
(a) monoadelphous (b) diadelphous
(c) tetradelphous (d) none of these
Rajasthan PMT-1999

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Ans. (a) : Malvaceae-
Distribution- Near about 82 genera and 1500 species, found in tropical and subtropical region.
Special features-
- Presence of epicalyx
- Twisted aestivation of corolla
- Epipetalous stamens and monodelphous condition (androecium), monothecous and dorsifixed anther.
- Ovary superior with axile placentation.

937. The fruit of Solanaceae family is :
(a) Berry (b) Capsule
(c) Pome (d) None of these

Rajasthan PMT-1999

Ans. (a) : The fruit of solanaceae family is Berry or Capsule.
- In solanaceae family the fruits are either berry/bacca or septicidal capsule.
- Berries usually have a thin epicarp fused with the thalamus to form the skin or exocarp, fleshy mesocarp and a thin endocarp. They usually develop from a superior ovary and their seeds get detached from the placenta at maturity.

It is Mostly herb (Tomato, Rasbhari), few shrub (Ashwagandha) and rarely tree (*Solanum gigantium*).

938. Timber yielding plant *Shorea robusta* belong to the family
(a) Fabaceae (b) Rubiaceae
(c) Verbenaceae (d) Dipterocarpaceae

Manipal-2014

Ans. (d) : Timber yielding plant *Shorea robusta* belongs to family Dipterocarpaceae. In this family near about 16 gnera and 695 species are found. It is used as an astringent in ayurvedic medicine and making for caulk boats and ships.

939. Which of the following characteristic represent family-Asteraceae?
(a) Superior ovary, syngenesious, single basal ovule
(b) Inferior ovary, monoadelphous, basal placentation
(c) Inferior ovary, syngenesious, axile placentation
(d) Syngenesious, basal placentation and epigynous

Manipal-2014, 2005

Ans. (d) : Family Asteraceae (compositae) contain inferior ovary i.e. stamen, calyx, corolla are localized above ovary level, syngenesious androecium (stamens) i.e. all anthers are united but filaments are free and basal placentation i.e. ovule seems to arise from the base of loculus.

940. What is the botanical name of mulberry?
(a) Morus (b) Antherea
(c) Attacus (d) Solanum

Manipal-2005

Ans. (a) : The botanical name of Mulberry plant is *Morus alba*, which belongs to family Moraceae. *Morus alba* fruit contains abundant protein, lipid, carbohydrate fiber, minerals and vitamins but low calories. It is a fast growing deciduous medium-sized tree.

941. Which of the following plants root is medicinal and leaves, flowers and fruits are edible as vegetable?
(a) *Helianthus annus*
(b) *Cucurbita maxima*
(c) *Solanum tuberosum*
(d) *Holostemma adakodien*

Manipal-2001

Ans. (d) : The roots of *Holostemma adakodien* (Arkapushpi) are useful in treating ophthalmopathy or chitis, cough, burning sensation stomach pain, constipation, fever, and tridoshas. The root can also be used as a rejuvenative drug, imparting resistant to diseases.
- Arkapushpi can be used as food. Fleshy flower buds and tender fruits are cooked as vegetable. Buds some times eaten raw.

942. Replum is found in family :
(a) Malvaceae (b) Brassicaceae
(c) Rosaceae (d) Cucrubitaceae

Manipal-2001

Ans. (b) : Replum is present family Brassicaceae. It is a frame like placenta through which the septum stretches. During dehiscence, the valves fall away, hence it is also called the false septum.

943. Gynoecium in the members of family Leguminosae is composed of ……..
(a) One carpel (b) Two carpels
(c) Three carpels (d) Five carpels

Karnataka CET-2005

Ans. (a) : Gynoecium in the members of family leguminosae is composed of superior ovary, mono-carpellary, unilocular with many locules and single style.
e.g. Gram, soya bean, sweet pea etc.

944. Free-central placentation is found in_____
(a) Dianthus (b) Argemone
(c) Brassica (d) Citrus

Ans. (a) : Free central placentation is present in single chambered ovary with ovules borne on the central axis.
Ex. Dianthus.

945. Read the following and identify correct combinations

	Genus	Family	Character
(a)	Datura	Solanaceae	Epipetalous stamens
(b)	Allium	Solanaceae	Tricarpellary gynoecium
(c)	Petunia	Solanaceae	Didynamous stamens
(d)	Crotalaria	Fabaceae	Diadelphous

AP EAMCET-2015

Ans. (a) : Datura : It is a poisonous flower plant belongs to the family solanaceae because of the presence of solitary flowers. The stamens are attached to the petal (epipetalous) and five in numbers.
(b) **Allium :** The perennial herb known as the onion or *Allium cepa* is high in dietary fibre. It is a member of liliaceae family. The flower of this family are actinomorphic, bisexual & gynoecium is tricarpellary.

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(c) **Pitunia :** It belongs to the family Solanaceae. It has 5 sepals 5 petals, 5 stamens & 2 corpels. It is a type of pentamerous flower.
(d) **Crotalaria :** Crotalaria (sunnhemp) is a tropical Asian plant of the legume family Fabaceae (Leguminaceae). The stamens of Crotalaria are united into two bundles is called diadelphous.

946. Study the following combinations

(I) Cymose inflorescence — Epipetalous — Solanum
(II) Homochlamydeous — Polyandrous — Allium
(III) Axile placentation — Radical leaves — Smilax
(IV) Zygomorphic — Diadelphous — Butea

(a) (I), (III) (b) (II), (IV)
(c) (I), (IV) (d) (III), (IV)

TS EAMCET-15.05.2016

Ans. (c) : Solanum species belongs to the family solanaceae
Solanum : Shows cymose inflorescence
Epipetalous means stamens fused with the petals.
Butea : Flower is zygomorphic.
Stamens are 10 in number & diadelphous (9 + 1)

947. Study the following lists

List-I		List-II	
(A)	**Strobilanthus**	**(I)**	**Tiger claw plant**
(B)	**Martynia**	**(II)**	**Century plant**
(C)	**Lodoicea**	**(III)**	**Neelakuranji**
(D)	**Viola**	**(IV)**	**Common pansy**
		(V)	**Double coconut**

The correct match is

	A	B	C	D
(a)	(II)	(III)	(I)	(V)
(b)	(III)	(II)	(IV)	(V)
(c)	(II)	(I)	(III)	(V)
(d)	(III)	(I)	(V)	(IV)

TS EAMCET-15.05.2016

Ans. (d) : 1. Strobilanthus is the botanical name of Neelakuranji plants which belongs to family – Acanthaceae.
2. Martynia is the botanical name of the Tiger claw plant which belongs to Martyniaceae family.
3. Lodoicea is the botanical name of double coconut & belongs to palm family, Arecaceae.
4. Viola is the botanical name of common pansy & it belongs to Violaceae family.

948. Arrange the following plants in descending order based on the number of locules in their ovaries

(I) Anacardium **(II) Citrus**
(III) Asparagus **(IV) Solanum**

(a) (II), (III), (IV), (I) (b) (III), (I), (IV), (II)
(c) (IV), (III), (I), (II) (d) (I), (IV), (III), (II)

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Ans. (a) : Citrus : It belongs to the family Rutaceae and shows the multilocular ovary.
Asparagus : It belongs to the family Asparagaceae and shows the trilocular ovary.
Solanum : It belongs to the family solanaceae and shows bilocular ovary.
Anacardium : It belongs to the family Anacardiaceae and shows unilocular ovary.

949. Identify the family belonging to the order Sapindales

(a) Poaceae (b) Anacardiaceae
(c) Solanaceae (d) Convolvulaceae

TS EAMCET-15.05.2016

Ans. (b) : Anacardiaceae belongs to the order 'Sapindales'.
- Solanaceae belongs to order 'Polemoniales'
- Convolvulaceae belongs to order 'Solanales'.
- Poaceae is another family belongs to order 'Poales'.

950. Vascular bundles are arranged in a ring in the members of family

(a) Orchidaceae (b) Iridaceae
(c) Euphorbiaceae (d) Lilliaceae
(e) Palmae

CMC Vellore-2008

Ans. (c) : Euphorbiaceae family shows the presence of bi-collateral bundles arranged in a ring form.
- In Euphorbiaceae, the primary vascular tissue consist of vascular bundles, usually in one or two rings around the pith. Vascular bundles are uniform in size. Each vascular bundle is conjoint, collateral or bicollateral and open.

951. The cloves which are used in food preparation are

(a) seeds (b) leaves
(c) flower buds (d) stem tips
(e) terminal buds

CMC Vellore-2008

Ans. (c) : The cloves that are used in food preparation are aromatic flower buds. Cloves are a versatile spice that looks like reddish brown spikes of 1 cm in length with a bulbous top.
- Cloves are the dried flower buds of an evergreen tree native to eastern Indonesia.
- In dicot family vascular bundle are arranged in ring. cloves belongs to family myrtaceae which is used as spice

952. How many female flowers occur in a cyathium ?

(a) One (b) Two
(c) Three (d) Four
(e) Many

CMC Vellore-2008

Ans. (a) : Cyathium has one reduced female flower. It is present in the centre and surrounded by many male flowers.
Each male flower is represented by a single stamen while a single pistil represents a female flower. Ex. Euphorbia.

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953. Which of the following features is absent in the family-Asteraceae?

(a) Cypsela fruit
(b) Capitulum inflorescence
(c) Hypogynous flowers
(d) Syngenesious anthers
(e) Pappus calyx

CMC Vellore-2008

Ans. (c) : The flowers of Asteraceae are not hypogynous.

• In hypogynous flowers the perianth and stamens are attached to the receptacle below the gynoecium, the ovary is superior to these organs and the remaining floral organs arise from below the point of origin of the carpel.

954. In the members of family-Malvaceae anthers are described as

(a) diadelphous and dithecous
(b) diadelphous and monothecous
(c) monoadelphous and monothecous
(d) monoadelphous and dithecous
(e) None of the above

CMC Vellore-2008

Ans. (c) : The androecium of Malvaceae members consists of numerous monadelphous stamens with apically divergent filaments bearing 1 – celled anthers.

The stamen are united into single bundle but anthers are free this condition is called as monoadelphous condition.

When stamen has only one lobed anther, called monothecous.

955. Diadelphous condition is found in

(a) rosaceae (b) papilionaceae
(c) leguminosae (d) cucurbitaceae

Rajasthan PMT-2003

Ans. (b) : In 'diadelphous' condition, the filaments of nine stamens are united into a bundle and tenth posterior stamen stand apart. This is the characteristic feature of family 'Papilionaceae' For e.g. Pea *(Pisum sativum)* Diadelphy is very commonly seen in family papilionaceous flowers. In diadelphy condition stamen are arranged into two bundle. (9 + 1).

956. Which one of the following is a monocarpic plant?

(a) Pear (b) Citrus
(c) Mango (d) Bambusa

Rajasthan PMT-2003

Ans. (d) : Monocarpic plants reproduce only once in their whole life span. The term monocarpic was first used by Alphonse de candolle Monocarpic plants can be divided into annuals, biennials and perennials.

e.g. Bamboo, rice, radish, carrot, wheat etc.

957. Match the names of plants given under Column I with the families to which they belong given under Column II; choose the answer which gives the correct combination of the alphabets:

	Column-I (Plant names)		Column-II (Family names)
A	*Nerium indicum*	p	Arecaceae
B	*Cassia fistula*	q	Solanaceae
C	*Caryota urens*	r	Liliaceae
D	*Nicotiana tobacum*	s	Apocynaceae
		t	Caesalpiniaceae

(a) A = s, B = t, C = p, D = q
(b) A = s, B = t, C = q, D = p
(c) A = t, B = s, C = q, D = p
(d) A = s, B = p, C = t, D = q

Karnataka CET-2000

Ans. (a) :

	Plant Name	Family Name
A.	*Nerium indicum*	Apocynaceae
B.	*Cassia fistula*	Caesalpiniaceae
C.	*Caryota Urens*	Arecaceae
D.	*Nicotiana tobaccum*	Solanaceae

958. Oval and eccentric starch granules are present in:

(a) Rice (b) Maize
(c) Potato (d) Ground nut

Rajasthan PMT-1995

Ans. (c) : Starch grains are tiny structures mode by plant during photosynthesis which is act as a store of glucose sugar units. The shape and size of the starch grains vary with the different plant species.

• Potato **:** The starch granules of potato are oval or eccentric in shape.

• Maize : Starch granules of maize are angular shaped.

• Rice : Polygonal & angular shaped starch granules.

959. Bicollateral vascular bundles are the characteristic of family:

(a) Malvaceae (b) Liliaceae
(c) Cucurbitaceae (d) Leguminosae

Rajasthan PMT-1995

Ans. (c) : Bicollateral vascular bundles are the characterstic of family – Cucurbitaceae.

• In such vascular bundle there are two patches of phloem one on each side of xylem.

• In such a vascular bundle there are two strips of cambium one on each side of xylem.

e.g. Cucurbita.

960. Axile placentation is present in family:

(a) Malvaceae and Liliaceae
(b) Cruciferae
(c) Cruciferae and Malvaceae
(d) All of the above

Rajasthan PMT-1995

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Ans. (a) : Axile placentation is found in bicarpellary to multicarpellary, syncarpous ovary, the carpels fused to form septa forming a central axis & ovules are arranged on the axis. This type of placentation is found in Liliaceae, Solanaceae, Malvaceae.

961. Green potatoes are toxic due to

(a) phytoalexins (b) solanine
(c) triazine (d) hormones

JIPMER-2012
VMMC-2009

Ans. (b) : Solanine is a glycoalkaloid poison or natural nerve toxin produced in the green part of the potato. It is a bitter poisonous crystalline alkaloid, which helps the plant to defend against predators, insects, diseases etc. Ingestion of it may cause vomiting, diarrhoea, headache and even paralysis of central nervous system.

962. In one of the constituent laboratory located in Lucknow, but attached to the following organization, extensive and exclusive research on medicinal and aromatic plants is carried out:

(a) IARI (b) ICMR
(c) NBRI (d) CSIR

AP EAMCET-1998

Ans. (d) : For research on medicinal and aromatic plants, Central Institute of Medicinal and Aromatic Plant (CIMAP) was established in Lucknow. This Institute is concerned with Council of Scientific and Industrial Research (CSIR) in Delhi.

ICMR– Indian council of medical Research.
IARI – Indian agriculture Research institute
NBRI- National botanical research institute.

963. Which of the following is correctly matched?

(a) aerenchyma-opuntia
(b) age pyramid-biome
(c) *Parthenium hysterophorus*- threat to biodiversity
(d) stratification-population

NEET-2016 Phase-II

Ans. (c) : *Parthenium hysterophorus* (congress grass or carrot weed). It is herbaceous, and annual plant belongs to the family **Asteraceae**. It is an alien species or deadly weed which rapidly covers the new surroundings and poses a serious threat to the environment.

964. Read the following four statements (A–D)

(A) Both, photophosphorylation and oxidative phosphorylation involve uphill transport of protons across the membrane
(B) In dicot stems, a new cambium originates from cells of pericycle at the time of secondary growth
(C) Stamens in flowers of Gloriosa and Petunia are polyandrous
(D) Symbiotic nitrogen-fixers occur in free-living state also in soil

How many of the above statements are right

(a) Four (b) One
(c) Two (d) Three

AIPMT (Mains)-2012

Ans. (c) : Polyandrous condition (having large and indefinite number of stamens) is present in Gloriosa (Family Liliaceae) and Petunia (Family Solanceae).

- Nitrogen fixation is the conversion of inert atmospheric nitrogen into utilizable compound of nitrogen like nitrate, ammonia, amino acid etc.
- Biological nitrogen fixation is performed by free living and symbiotic bacteria and cyanobacteria. Symbiotic nitrogen fixers occur in association with roots of higher plants.

965. Study the following lists

List I	List II
(A) Arachis	**1. Swollen placenta**
(B) Cichorium	**2. Epicalyx**
(C) Lilium	**3. Fasciculate tuberous root**
(D) Physalis	**4. Geocarpy**
	5. Bulbils

	A	B	C	D
(a)	4	3	2	5
(b)	4	1	2	3
(c)	5	4	3	1
(d)	4	3	5	1

AP EAMCET-2008

Ans. (d) :
(A) Arachis - Geocarpy
(B) Cichorium - Fasiculate tuberous root
(C) Lilium - Bulbis
(D) Physalis - Swollen placenta

966. Which is expressing right appropriate pairing:

(a) Brassicaceae - Sunflower
(b) Malvaceae - Cotton
(c) Papilionaceae - Catechu
(d) Liliaceae - Wheat

AIPMT-2000

Ans. (b) : Malvaceae is also known as cotton family or mallow family. The plants of this family are cosmopolitan in distribution, although more common in tropical (warm) regions. Gossypium (cotton) is an important genera of this family.

- Sunflower belongs to family compositae.
- Wheat belong to family poaceae.
- Catechu belongs to family mimosaceae.

967. The given formula belongs to:

$\mathbf{Br \oplus \male\ Epi_3\ K_{(5)}\ C_5\ A_{(\infty)}\ G_{(\underline{5})}}$

(a) Solanaceae (b) Malvaceae
(c) Gramineae (d) Compositae

Haryana PMT-2005
JIPMER-2005
BHU PMT-2003

Ans. (b) : The floral formula of hibiscus is written in the form as follows- $Br \oplus \male\ Epi_3\ K_{(5)}\ C_5\ A_{(\infty)}\ G_{(\underline{5})}$. In this formula every symbol and number has been appointed a specific meaning and characteristics to it.

@apna_pdf

For example:-

• 'Br' symbolises that the hibiscus is a bracteate flower, '⊕' this sign symbolises that hibicus is an Actinomorphic flower.

• ♂ ♀ symbolize the fact that the china rose is a bisexual flower, 'Epi_3' symbolizes epicalyx. The total number of three epicalyx.

• 'K_5', K stands as a term for the calyx whorl of flowers. The total number of five sepals in the calyx whorl symbolises K in $K_{(5)}$. The gamosepalous condition is represented by the brackets given here.

• C_5 symbolises the carolla whorl consist of five petals in a state known as polypetalous, $A_{(\infty)}$ represent the androecium whole of the flower.

• There are a huge number of stamens present in the hibiscus fused into a single tube (monoadelphous condition) which is attaching line from C_5 to $A_{(\infty)}$ explain the epipetalous condition of flower. The gynoecium whorl of the flower is represented by $G_{(5)}$ where 5 representing 5 fused carpels . The line below 'G' represented superior ovary (hypogynous condition)

968. Which of the following is used as green manure?

(a) *Azolla* (b) *Azadirachta indica*
(c) *Crotolaria juncea* (d) *Hevea brasilliansis*

JIPMER-2005
BHU PMT-2003

Ans. (c) : *Crotalaria juncea* known as sunn or sunn hemp is used as green manure. It is a tropical Asian plant of the legume family. It is a source of green manure, fodder and lignified fiber, which is obtained from its stem.

969. Commercial cork is obtained from:

(a) *flax* (b) *Juglans regia*
(c) *Hevea brassiliansis* (d) *Quercus suber*

JIPMER-2005
BHU PMT-2003

Ans. (d) : Commercial cork is obtained from periderm layers of a *Quercus suber* plant (cork oak tree). Cork has many uses including urine bottle stoppers, bulletin boards, coasters, fishing bobbers, gaskets for engines, tenis, racket etc. It is native to southwest Europe and north west Africa.

970. $\oplus ♂ ♀ K_{(5)} C_{(5)} A_5 \underline{G}_{(2)}$ is die floral formula of :

(a) Solanaceae (b) Asteraceae
(c) Malvaceae (d) Cruciferae

Punjab MET-2003
AIPMT-1991

Ans. (a) : Family solanaceae contribute several important food, drug and ornamental plants to humans. The floral formula for solanaceae is

$\oplus ♂ ♀ K_{(5)} C_{(5)} A_5 G_{(2)}$

971. Obliquely placed ovary and swollen placenta is associated with which of the following families?

(a) Asteraceae (b) Solanaceae
(c) Brassicaceae (d) Malvaceae

J&K CET-2012

Ans. (b) : Solanaceae : Gynoecium of solanaceae is characterised by bicarpellary, syncarpous, superior ovary axile placentation, many ovule in each locule, ovary obliquely placed, posterior carpel to the right about 45° from median and anterior to the left.

972. On the basis of position of the ovary, mustard plants are

(a) hypogynous (b) perigynous
(c) epigynous (d) zygomorphic

J&K CET-2012

Ans. (a) : Hypogynous : Mustard belongs to family Brassicaceae (Cruciferae). The flowers in this family are bisexual or hermaphrodite complete, pedicillate Hypogynous, tetradynamous or bimerous. Androceium in tetradynamous condition, anther dithecous, basifixed and stamens introrse. Gynoecium bicarpellary, syncarpous unilocular in the beginning but due to the formation of false. Septum (Replum) ovary becomes bilocular, ovary superior, parietal placentation but tricarpellary in lepidium, and tetracarpellary in Nasturtium, style short and stigma bilobed.

• The flowers of family Asteraceae are epigynous, usually pentamerous.

973. Which one of the following is being utilized as a source of bio-diesel in the Indian country side?

(a) Euphorbia (b) Beetroot
(c) Sugarcane (d) Pongamia

Rajasthan PMT-2010

Ans. (d) : Pongamia : Biodiesel produced from pongamia oil has been considered as promising option for diesel engines because of its environmental friendliness.

• Pongamia (Kanjar) is a genus of fabaceae family. In the Indian country side, pongamia (Kanjar) is being utilized as a source of biodiesel oil is extracted from the seeds of pongamia,

974. One of endangered species of Indian medicinal plants is that of

(a) Podophyllum (b) Ocimum
(c) Garlic (d) Nepenthes

Rajasthan PMT-2010

Ans. (a) : An endangered species is a type of organism that is threatened by extinction. Species become endangered for two main reasons :

(i) Loss of habitat

(ii) loss of genetic variation.

Cutting down of forests have drastically decreased the population of medicinal and aromatic plants ex- *Podophyllum hexandrum, Atropa acuminata, Skimmia anquetilia* etc.

975. The anthers in Solanaceae are :

(a) monothecus, introrse
(b) dithecus, extrorse
(c) dithecus, introrses
(d) monothecus, extrorse

BCECE-2006

@apna_pdf

Ans. (c) : The third whorl of a flower is called the androecium. Androecium is composed of stamens and each stamen is made up of filament and an anther. Depending on the number of anther lobes the stamens are termed as monothecous (one lobed), dithecous (two lobed).

Three types of dehiscence of anther as – extrores introrse, and latrose.

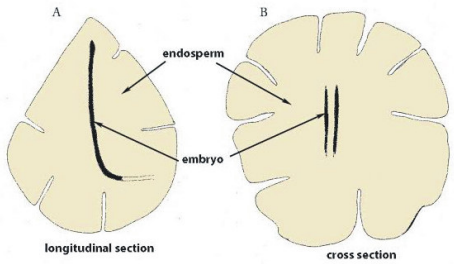
- In extrorse type of dehiscence, anthers dehisce towards the petals.
- In introrse type of dehiscence anther dehisce towards gynoecium
- In latrose type of dehiscence anther dehisce laterally.
- In Solanaceae, anthers, are of dithecous type dehiscing introrse.

976. Ruminate endosperm found in

(a) Cruciferae (b) Asteraceae
(c) Euphorbiaceae (d) Annonaceae

BCECE-2010

Ans. (d) : Ruminate endosperm is found in annonaceae family : A structure of the endosperm made of albumen of a seed which gives a mottled appearance to its section, and which results from the infolding dark inner layer of the seed coat into the light coloured matter of the endosperm, as in the nutmeg. Example of families with Ruminate endosperm – Rubiaceae, Annonaceae Aristolochiaceae, Palmaceae and Myristicaceae.



RUMINATE ENDOSPERM

977. Asafoetida is a

(a) tannin (b) alkaloid
(c) resin (d) oil

AMU-2011

Ans. (c) : The dried latex secreted from the rhizome or tap roots of various species of Ferula is known as asafoetida.

It is commonly known as heeng and is used as a digestive aid, as a condiment in food and also in pickling.

- Resins are greyish-white in colour where fresh and become amber coloured when dried.

Used in different diseases such as whooping cough, asthma, ulcer, week digestion, influenza, epilepsy etc.

978. Resupinate condition is characteristic of the flowers belonging to the most advanced family of monocots

(a) Palmae (b) Liliaceae
(c) Orchidaceae (d) Gramineae

AMU-2011

Ans. (c) : Resupinate condition is characteristic of flower belonging to the family Orchidaceae. In resupinate condition the flowers are usually resupinate at anthesis as the pedicel or ovary twists at an angle of 180° during development.

Orchidaceae is considered as the most advanced family of monocots. The members of this family are used in making perfumes, in horticulture and some are also used as food.

979. The petiole modified into flattened lamina like structure is present in

(a) Acacia nilotica
(b) Acacia Arabica
(c) Acacia Australasia
(d) Acacia anuriculoformis

AMU-2011

Ans. (d) : Xerophytic plants are adapted to survive in an environment with little water. In these plants, the leaves are changed into spines.

The petiole modified into the flattened lamina like structure is known as phyllode.

- Phyllode is a modified petiole that connects the leaf to the stem or branch or rachis (common axis of the leaflets of a compound leaf) that has become flattened and green to perform the functions of a leaf it is found in several species of Australian Acacia.

example:- *Acacia auriculoformis.*

980. Tea and coffee are affected by:

(a) Phytophthora (b) Cephaleuros
(c) Herviella (d) Albugo candida

Haryana PMT-2005
JIPMER-2005

Ans. (b) : Cephaleuros is a geen alga which causes disease in tea & coffe plant called Red rust of tea. This algae is parasitic on some economic plants of tropical and subtropical plants.

981. Feathery stigma belongs to

(a) Wheat (b) Pea
(c) Datura (d) Caesalpinia

MGIMS Wardha-2011
AIIMS-2011

Ans. (a) : Feathery stigma are generally found in Poaceae family and wheat belong to this family. Wheat has feathery stigma so it is wind pollinated and feathery stigma are necessary for capturing pollen grain.

982. A feature of Selaginella that is of great evolutionary significance in the presence of:

(a) rhizosphere
(b) heterosporous condition
(c) strobili
(d) protonema

JIPMER-1998

Ans. (b) : A feature of selaginella that is of great evolutionary significance in the presence of heterosporous condition means different types of spores which are different in function size and structure of the plant.

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983. Phytochrome was discovered by

(a) W Went (b) Gamer and Allard
(c) F F Blackman (d) R Hill

CG PMT-2006

Ans. (b) : Phytochrome was discovered by Gamer and Allard. Phytochrome are group of proteins bound to light absorbing pigment. Phytochrome is a class of photoreceptors protein.

984. Simple sieve plate with single perforation is found in

(a) Cucurbita (b) Prunus
(c) Pyrus (d) Vitis

J&K CET-2007

Ans. (a) : Sieve plates are mostly located on the overlapping adjacent end walls. The sieve plates have a larger pore than the other sieve areas in the cell, sieve plate help in transport of nutrients stem and leaves from the roots. Cucurbita is a genus of herbaceous plants which belong to the family cucurbitaceae.

985. Placentation of Mimosa pudica is

(a) basal (b) marginal
(c) axial (d) parietal

Haryana PMT-2011

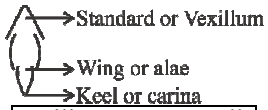
Ans. (b) : *Mimosa pudica* (touch me not) belongs to Mimosaceae family. Gynoecium is monocarpellary, Apocarpous with ovules on marginal placentation.

986. The standard petal of a papilionaceous corolla is also called

(a) Corona (b) Carina
(c) Pappus (d) Vexillum

NEET-2016 Phase-I

Ans. (d) : Papilionaceous corolla, this type of aestivation includes the presence of five petals in it. Out of these petals, the largest one is called standard or vexillum, the two lateral petals are known as wings and two small anterior petals are termed as keel.



Papilionaceous corolla

987. Tricarpellary, syncarpous gynoecium is found in flowers of

(a) Poaceae (b) Liliaceae
(c) Solanaceae (d) Fabaceae

NEET-2016 Phase-I

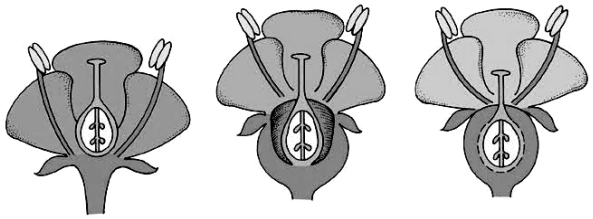
Ans. (b) : Tricarpellary syncarpous gynoecium is a characteristic features of flowers of Liliaceae.
Liliaceae family is a monocot family eg- Onion, Garlic etc.
Poaceae- Monocot family, flower is trimerous, fruit is caryopsis.
Solanaceae - Persistent Calyx, Superior ovary, epipetalous condition eg- Potato, tomato, brinjal etc.
Fabaceae - fabaceae family are known as pulse family, flower bisexual, diadelphous condition.

988. Ovary is half-inferior in the flowers of –

(a) Guava (b) Plum
(c) Brinjal (d) Cucumber

AIPMT (Screening)-2010

Ans. (b) : Perigynous Flowers are found in rose, peach, cherry, plum, prunes etc.
- Guava and cucumber have epigynous flower.
- China rose and brinjal have hypogynous flower.

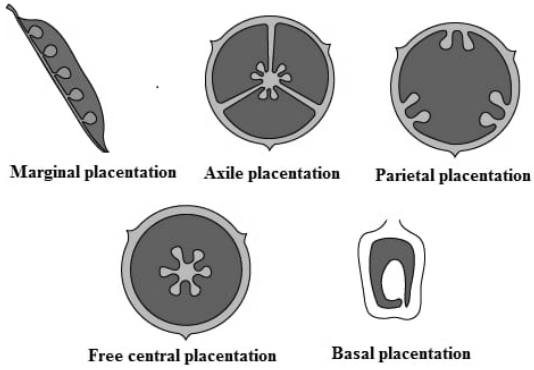


989. In unilocular ovary with a single ovule the placentation is:

(a) Marginal (b) Basal
(c) Free Central (d) Axile

AIPMT (Screening)-2010

Ans. (b) : Placentation- Ovule are attached to the inner wall of ovary is called placenta and arrangement is called placentation.
- In basal type of placentation the ovary is unilocular and ovules generally reduced to one borne at the base of the ovary e.g. compositae family.



990. The correct floral formula of soyabean is

(a) % ♀ $K_{(5)}C_{1+2+(2)}A_{1+(9)}\underline{G}_1$

(b) % ♀ $K_{(5)}C_{1+(2)+2}A_{(9)+1}\bar{G}_1$

(c) % ♀ $K_{(5)}C_{1+(2)+2}A_{(9)+1}\underline{G}_1$

(d) % ♀ $K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$

AIPMT (Mains)-2010

Ans. (d) : The plant belonging to the family fabaceae such as Soyabean, Pea, Sem, moong , gram etc have the floral formula:-

% ♀ $K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$

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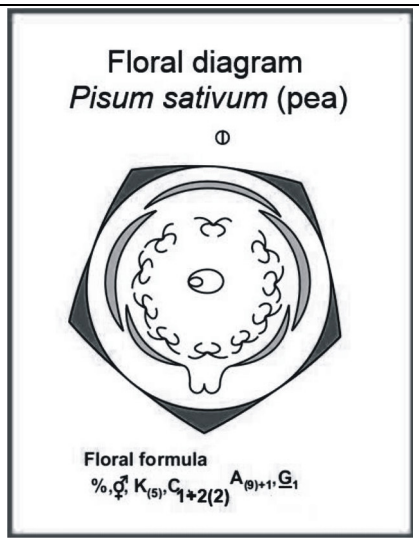


991. Which of the following plant species you would select for the production of bioethanol ?

(a) Jatropha (b) Brassica
(c) Zea Mays (d) Pongamia

AIPMT-2009

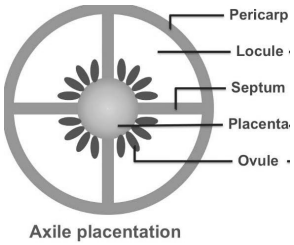
Ans. (a) : The oil obtained from Jatropha seeds can be processed to yield the biofuel. The production of bioethanol from plants depends on their glucose content. There are various crop plants like maize that have good glucose content but these are used as a food crop. Therefore, the best alternative is to choose plants that can be used as biofuel source. The seeds of this plant are rich in fatty acid methyl esters and these produce a high amount of energy.

992. An example of axile placentation is -

(a) Marigold (b) Argemone
(c) Dianthus (d) Lemon

AIPMT-2009

Ans. (d) : The placentae develop from the central axis which correspond to the confluent margins of carpels, it occurs in bi to multilocular ovary ex- solanaceae. Malvaceae and Rutaceae family. Axile placentation is found in multicarpellary syncarpous gynoecium. The number of these chambers are equal to the number of carpels.

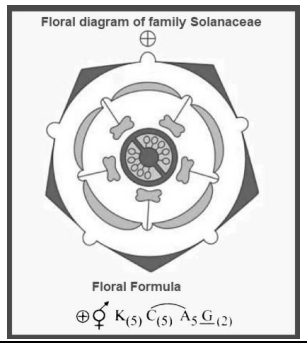


993. The floral formula $\oplus\ \delta\ K_{(5)}\ \overset{\frown}{C_{(5)}}\ A_5\ \underline{G_{(2)}}$ is that of :

(a) Tobacco (b) Tulip
(c) Soyabean (d) Sunnhemp

AIPMT-2009

Ans. (a) : The floral formula of tobacco is $\oplus\ \delta\ K_{(5)}\ \overset{\frown}{C_{(5)}}\ A_5\ \underline{G_{(2)}}$. Tobacco belongs to family solanaceae. The flower is actinomorphic, bisexual, 5 sepals gamosepalous, 5 petals gamopetalous, corolla, 5 stamens epipetalous, superior ovary and axile placentation.



994. Rauwolfia - serpentina belongs to ..... family.

(a) Liliaceae (b) Fabaceae
(c) Apocynaceae (d) Solanaceae

Karnataka CET-2007

Ans. (c) : Sarpagandha (*Rauwolfia Serpentina*), is a genus of evergreen trees and shrubs, widely distributed to India, commonly known as devil peppers in the family Apocynaceae.

- They are used to treat high blood pressure (Hypertension)

995. Cellulose fibre is obtained from gossypium.

(a) stem surface
(b) seed hair
(c) leaf surface
(d) root hair

JIPMER-2004

Ans. (b) : Cellulose fibers are made with ethers or esters of cellulose, which can be obtained from the bark, wood or leaves of plant, or from other plant-based material. In addition to cellulose, the fibers may also contain hemi-cellulose and Lignin, with different percentages of these components altering the mechanical properties of the fibers.

996. A monocarpic plant is one, which

(a) has only one carpel
(b) flowers once in a life-time
(c) produces only one seed
(d) produces only one fruit

JIPMER-2012

Ans. (b) : Monocarpic plant are mostly biennial and annual and very few are perennial.

- Monocarpic plant is a plant which produces flowers and fruits only once in life e.g. Pea, Mustard, Bamboo and Agave.
- Polycarpic plants can have flowers and seeds many time during its lifetime.

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997. Two plants A and B belonging to Solanaceae are observed. In plant A the number of locules in the ovary of a flower is half of that of its carpel number. In plant B, the number of locules in the ovary of a flower is double the number of carpels. Identify the plants A and B respectively

(a) Capsicum, Datura
(b) Cestrum, Petunia
(c) Withania, Solanum
(d) Lycopersicon, Nicotiana

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Ans. (a) : In *Datura matal* an annual wild herb, poisonous.

• Herbaceous, aerial, erect, branched, hairy green, leaves alternate, exstipulate, flowers actinomorphic, stamen epipetalous, alternating with petals, ovary bicarpellary, syncarpous, axile placentation and inflorescence cymose, ovary obliquely placed. Saptum oblique with highly swallen placenta, many ovules in each locule, fruit berry or capsule is known as solanaceae.

• In Capsicum, gynoecium is bicarpellary, syncarpous, ovary superior. Due to the imperfect development of the cross wall, ovary is unilocular in the upper part.

998. Identify the characters of gynoecium found a members of Asteraceae. Fabaceae, Liliaceae and Solanaceae, respectively

I. Tricarpellary syncarpous, ovary superior and trilocular
II. Bicarpellary syncarpous, ovary superior and usually bilocular
III. Bicarpellary syncarpous, ovary inferior and unilocular
IV. Monocarpellary, ovary half-inferior and unilocular

(a) II, I, III, IV (b) III, IV, I, II
(c) IV, III, II, I (d) I, II, IV, III

AP EAMCET-2007

Ans. (b) : In the members of family Compositae (Asteraceae) gynoecium is bicarpellary, syncarpous, ovary inferior, Unilocular, basal placentation, and style short and simple, and stigma bifid.

• In Leguminosae (fabaceae) gynoecium is monocarpellary ovary superior, unilocular with marginal placentation.

• In liliaceae androecium is polyandrous epipetalous and gynoecium is tricarpellary, syncarpous, Ovary superior, trilocular with axile placentation.

• Solanaceae. gynoecium is bicarpellary syncarpous, Ovary superior, carpel placed obliquely generally bilocular with axile placenatation.

999. Which one of the following families shows both freedom and fusion in four successive whorls of the flower from exterior in different members?

(a) Malvaceae (b) Solanaceae
(c) Asteraceae (d) Liliaceae

AP EAMCET-2007

Ans. (d) : The flower of the Liliaceae family are actinomorphic, bracteate, hypogynous, complete and bisexual.

Perianth is of six tepals in 2 whorls of 3 each (3+3). They are free or united (**e.g-Alium**). The perianth segments are usually petaloid and the two whorls are generally undifferentiated into calyx and corolla. Anther dithecous, introrse and may be dorsifixed or basifixed.

1000. Study the following lists

List–I	List–II
(A) Laxative	**1. Neem**
(B) Anticorrosion	**2. Groundnut**
(C) Lubricants	**3. Cotton**
(D) Nitro cellulose	**4. Mango**
	5. Rice

Code :

	A	B	C	D
(a)	2	3	5	1
(b)	4	5	2	3
(c)	5	4	3	2
(d)	1	2	4	5

AP EAMCET-2007

Ans. (b) :

A	B	C	D
4	5	2	3

List - I	List - II
(A) Laxative	4. mango
(B) Anticorrosion	5. Rice
(C) Lubricants	2. Groundnut
(D) Nitro cellulose	3. Cotton

1001. Arrange the following plants in ascending order based on the number of xylem strands in their roots

I. Trapa **II. Pisum**
III. Castanea **IV. Nicotiana**

(a) II, IV, III, I
(b) III, IV, II, I
(c) IV, III, I, II
(d) I, II, III, IV

AP EAMCET-2007

Ans. (d) :

Trapa spinosa < Pisum < Castanea sativa < Nicotiana tobacum

Only one xylem strand occurs in the slender root of the **hydrophyte Trapa natans**. In **Nicotiana** the root are diarch. In Pisum the root is triarch. In Castanea, the root is tetrarch.

1002. The internal structure of a plant stem is observed. There is a discontinuous ring of angular collenchyma below the epidermis. Type of vascular bundles are of the same type as in the stems of solanaceous plants. Sieve tube elements possess simple sieve plates identify the plant

(a) Helianthus (b) Cucurbita
(c) Zea (d) Hydrilla

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Ans. (b) : Cucurbita belongs to family cucurbitaceae, stem pentangular, fistular (hallow) usually protrats, hairy, may be climber through the tendrils. Bicollateral vascular bundle occur in stem.
Hypodermis in the stem of Cucurbita is made up of angular collenchymas.

1003. Arrange the following plants in the descending order based on the number of their mericarps

I. Ricinus **II. Coriandrum**
III. Ocimum **IV. Abutilon**

(a) IV, III, II, I
(b) II, I, III, IV
(c) IV, III, I, II
(d) I, IV, II, III

AP EAMCET-2007

Ans. (c) : Following plants are arranged in the descending order based on the number of their mericarps
(IV) Abutilon > (ii) Ocimum > (i) Ricinus > (ii) Coriandrum

1004. Identify the plant in which the tangential walls of collocytes are excessively chickened but radial walls are thin

(a) Monstera (b) Cucurbita
(c) Lactuca (d) Eupatorium

AP EAMCET-2010

Ans. (d) : Eupatorium have tangential wall of collocytes which are excessively thickened but radial wall are thin.
Monstera – One of the best ways to train your monestra to grow upward is to use a support such as a **moss pole**. You also have other options since monsterds can adapt to climbing on all sorts of supports.
Cucurbita – Cucurbita is native to the Andes and Mesoamerica five species are grown worldwide for their edible vegetable variously know as **squash pumpkin**. Texture of butter cup squash 'Delica' during storage and the effect of cooking on the texture.
Lactuca – *Lactuca sativa* uptake by roots and internal transport of food in plant is determined by the concentration and speciation of the trace element in the soil solution and binding of the root cell wall.

1005. Fruits, which break at maturity into number of pieces equal to the number of carpels are found in.

I. Aristolochia II. Datura
III. Dolichos IV. Abelmoschus
(a) I, II (b) II, III
(c) I, IV (d) III, IV

AP EAMCET-2010

Ans. (c) : Aristolochia – Fruits of **Aristolochia** and **Abelmoschus** break at maturity into number of carpel.
Datura – Datura is genus of nine species of poisonous, vespertine flowering plant belonging to the nightshade family **Solanaceae**. They are commonly known as **Thornapples or Jimsonweeds** but are also known as **devils trumpets**.
Dolichos – Dolichos is a genus of flowering plant in the legume family **Fabaceae.** These are herbs and shrubs growing upright sometimes with climbing stems.

1006. A teacher was explaining about a plant, whose venation pattern is basically similar of eryngium. Fruit is berry and stem show sign of perennation.
He was trying to arrive at one of the following.

(a) Musa (b) Brinjal
(c) Glory Iily (d) Mango

AP EAMCET-2010

Ans. (a) : • Musa (Banana) belong to the family Musaceae, and spadix inflorescence is found in Banana.
Musa (banana) plant show parallel venation pattern which is also in eryngium, the fruit of musa is berry and stem show signs of perennation i.e. survival of plant from one year to the next by vegetative means.

1007. Study the following lists.

	List I	List II
(A)	Cohesion among the anthers only	(i) Citrus
(B)	Cohesion of staminal filaments only into bundles	(ii) Cucurbita
(C)	Adhesion of stamens to tepals	(iii) Allium
(D)	Adhesion of stamens to sepals	(iv) Grevillea
		(v) Helianthus

The correct match is :

	A	B	C	D
(a)	5	2	4	3
(b)	4	1	2	5
(c)	5	2	4	3
(d)	5	1	3	4

AP EAMCET-2010

Ans. (d) :

List I	List II
Cohesion among the anthers only	Helianthus (*Helianthus annuus*) is an emollient that makes product smoother and more spreadable. It is a member of the compositae family.
Cohesion of staminal filament only into bundle	Citrus – Citrus is a genus of flowering tree, shrubs and in the family, Rutaceae, plant in the genus produce citrus fruit.
Adhesion of stamen to tepals	Allium – Allium is a genus of monocotyledonous flowering plant that include 100 of species.
Adhesion of stamen to Sepal	Grevillea – Grevillea commonly known as spider flowers and family Proteaceae.

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1008. Study the following lists

List-I		List-II	
A.	**Arachis**	**1.**	**Swollen placenta**
B.	**Cichorium**	**2.**	**Epicalyx**
C.	**Lilium**	**3.**	**Fasciculate tuberous roots**
D.	**Physalis**	**4.**	**Geocarpy**
		5.	**Bulbils**

The correct match is

	A	B	C	D
(a)	4	3	2	5
(b)	4	1	2	3
(c)	5	4	3	1
(d)	4	3	5	1

AP EAMCET-2008

Ans. (d) :

List-I		List-II	
A.	Arachis	1.	Geocarpy
B.	Cichorium	2.	Fasciculate tuberous roots
C.	Lilium	3.	Bulbils
D.	Physalis	4.	Swollen placenta

1009. Study the following table

i.	**Peperomia**	**Leaf succulent**	**Leaf epidermal**
ii.	**Calotropis**	**Non-succulent**	**Root cells with thickened cell walls**
iii.	**Tribulus**	**Ephemeral**	**Stem stores water**
iv.	**Ammophila Dicot plant**	**Dicot plant**	**Rolling in of leaves to check water loss**

Identify the correct pair of answer.

(a) i, ii (b) i, iii
(c) ii, iii (d) ii, iv

AP EAMCET-2008

Ans. (a) : Succulents or drought avoiding plant store H_2O when available in excess in form of mucilage. Leaf succulents are Peperomia.
Peperomia obtusifolia also known as baby rubber plant, American rubber plant.
True xerophytes are non succulent like Calotropis.

1010. Identify three of the following plants, which exhibit the physiological process described as 'Necessary Evil'

(i) Potamogeton (ii) Sagittaria
(iii) Limnophila (iv) Nymphaea

The correct match is

(a) i, ii, iii (b) ii, iii, iv
(c) i, ii, iv (d) i, iii, iv

AP EAMCET-2008

Ans. (b) : • The physiological loss of water in the form of water vapour mainly from the stomata in leaves but also through evaporation from the surface of leaf, flowers and stems.
• Cuticle is usually absent in submerged form as Potamogeton and poorly developed in floating forms as Nymphaea. The stomata are completely absent in Potamogeton. Therefore, the physiological process called necessary evil does not take place.

1011. Study the following related to used plants and identify the correct match for sorghum and cotton respectively

(i) Blood purification and organs fertilizer.
(ii) Animal feed and paper industry.
(iii) Vitamin 'B' and cosmetics.
(iv) Explosives and organic fertilizer.

The correct pair is:

(a) i, ii (b) ii, iii
(c) iii, iv (d) ii, iv

AP EAMCET-2008

Ans. (d) : Cotton contains cellulosic textile fiber suitable for a wide range of clothing, house hold and industrial product. The Sorghum crop is quite valuable for forage and can be used for feeding to animals.

1012. Study the following lists

List-I		List-II	
A.	**Arachis**	**1.**	**Basket making**
B.	**Mangifera**	**2.**	**Saky**
C.	**Cajanus**	**3.**	**Fixed oil**
D.	**Oryza**	**4.**	**Diuretic**
			Nitrocellulose

The correct match is:

	A	B	C	D
(a)	3	4	1	2
(b)	2	3	4	5
(c)	3	1	5	4
(d)	5	3	2	1

AP EAMCET-2008

Ans. (a) :

List-I		List-II	
A.	Arachis	1.	Fixed oil
B.	Mangifera	2.	Diuretic
C.	Cajanus	3.	Basket making
D.	Oryza	4.	Saky

1013. Read the following lists

List-I		List-II	
A.	**Extra foliar nectarines**	**1.**	**Achras**
B.	**Schizogenous cavities**	**2.**	**Tropaeolum**
C.	**Laticiferous ducts**	**3.**	**Passiflora**
D.	**Hydathodes**	**4.**	**Eucalyptus**
			Pinus

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	A	B	C	D
(a)	3	1	2	4
(b)	2	1	3	4
(c)	3	5	1	2
(d)	5	2	1	3

AP EAMCET-2008

Ans. (c) :

List-I		List-II	
A.	Extra foliar nectaries	1.	Passiflora
B.	Schizogenous cavities	2.	Pinus
C.	Laticiferous ducts	3.	Achras
D.	Hydathodes	4.	Tropaeolum

1014. In the flowers of a plant, the ovarian part is fused, but styles and stigmas are free. Its ovary becomes unilocular due to breakdown of partition wall and the ovules are attached to a central axis. Identify the plant.

(a) Dianthus (b) Abutilon
(c) Nymphaea (d) Michelia

AP EAMCET-2008

Ans. (a) : Dianthus belongs to the caryophyllaceae family commonly called the pink family.
In the flower of Dianthus, ovarian part is fused but style and stigma are free. Its ovary becomes unilocular due to break down of partition wall and the ovule are attached to a central axis i.e. ovary is syncarpous, superior, unilocular, with many ovule and free central placentation.

1015. Read the following lists

List-I		List-II	
A.	**Gall flowers**	**1.**	**Theobroma**
B.	**Sympodial axis**	**2.**	**Bougainvillea**
C.	**Achlamydeous**	**3.**	**Ficus**
D.	**Cauliflory**	**4.**	**Euphorbia**
		5.	**Hemelia**

The correct match is:

	A	B	C	D
(a)	3	5	1	2
(b)	3	4	2	1
(c)	3	4	1	2
(d)	3	5	4	1

AP EAMCET-2008

Ans. (d) :

List-I		List-II	
A.	Gall flowers	1.	Ficus
B.	Sympodial axis	2.	Hemelia
C.	Achlamydeous	3.	Euphorbia
D.	Cauliflory	4.	Theobroma

Hypanthodium inflorescence is found in ficus
Polychasial cymose inflorescence is found in Hemelia.
Cyathium inflorescence is found in euphorbia.

1016. Identify the set of characteristics related to plants belonging to family Fabaceae from the following:

(a) Actinomorphic flower, syncarpous ovary and marginal placentation
(b) Peristent calyx, epipetalous stamens and leguminous fruit
(c) Papilionaceous corolla, axile placentation and leguminous fruit
(d) Vexillary aestivation of corolla, diadelphous stamens and monocarpellary, unilocular ovary

Karnataka CET-2014

Ans. (d) : Plant belonging to the family fabaceae show descending imbricate aestivation of corolla stamen 10 (9 + 1) Diadelphous condition 2 bundles. Filaments of 9 stamens united but anther remains free and one stamen free and marginal placentation.

1017. Match the names of the economically important plants (or their products) listed in Column-I with the families to which they belong given in Column-II. Choose the answer which gives the correct combination of alphabets of the two columns:

Column-I	Column-II
(A) Sunflower	**p. Acanthaceae**
(B) Tulsi	**q. Compositae**
(C) Coffee	**r. Labiatae**
(D) Vasaka	**s. Rubiaceae**
	t. Euphorbiaceae

(a) A = q, B = r, C = s , D = p
(b) A = q, B = s, C = p , D = t
(c) A = s, B = r, C = p , D = q
(d) A = r, B = t, C = s , D = q

Karnataka CET-2009

Ans. (a) :

Plants	Family
Sunflower	Compositae
Tulsi	Labiatae
Coffee	Rubiaceae
Vasaka	Acanthaceae

Compositae- Ovary inferior, bicarpellary syncarpous, unilocular, with basal placentation.
Labiatae- Gynoecium bicarpellary, syncarpous bilocular but tetralocular due to the formation of false septum. superior ovary with axile placentation.
Acanthaceae- Gynoecium bicarpellary, syncarpous bilocular, superior ovary with axil placentation.
Rubiaceae- Gynoecium bicarpellary rarely polycarpellary, syncarpous inferior ovary rarely half inferior or superior, sometimes unilocular with axile placentation.

1018. A plant has an androecium with monadelphous stamens, monothecous and reniform anthers. The corolla exhibits contorted aestivation. The plant could be

(a) Vinca (b) Nerium
(c) Hibiscus (d) Rauwolfia

Karnataka CET-2009

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Ans. (c) : Monadelphous stamens, monothecous and reniform anther lobes are seen in malvaceae family.

- **Monoadelphous:-** Filament of all stamens are united to form a single bundle but anthers are free.
- **Monothecous:-** Has only one anther lobe anther
- **Reniform:-** Kidney shaped
- **Contorted aestivation:-** Sepals (partly inner 2 partly outer

1019. Given below is the floral diagram of a flower. Which of the following descriptions of the flower matches the floral diagram ?

(a) Heterochlamydeous, gamopetalous, pentamerous and bisexual
(b) Heterochlamydeous, gamopetalous, tetramerous and bisexual
(c) Homochlamydeous, polypetalous, pentamerous and bisexual
(d) Homochlamydeous, gamopetalous, tetramerous and unisexual

Karnataka CET-2012

Ans. (b) : According to the floral diagram of flower, it is a heterochlamydeous, gamopetalous, tetramerous and bisexual type of flower.

1020. The host for Cercospora personata belong to this family of angiosperms :

(a) Graminae (b) Leguminosae
(c) Malvaceae (d) Asclepiadaceae

Karnataka CET-2012

Ans. (b) : *Cercospora personata* host (ground nut) belongs to Leguminosae family of angiosperms. Leguminosae is an important family of flowering plants. It is also known as pea or legume family. Most species are plant pathogens. It causes leaf spots in groundnut. The cercospora is a fungus belongs to deuteromycotina subdivisions.

1021. The following diagrams A, B, C, D and E show the different types of arrangement of statements based on the cohesion of their parts in different plants Assign the statements to their respective plants. Choose the correct answer.

(a) **A=** *Hibiscus rosa sinensis*, **B** = *Bombax ceiba*, **C** = *Cucurbita pepo*, **D** = *Crotalaria juncea*, **E** = *Helianthus annus*.
(b) **A** = *Hibiscus rosa sinensis*, **B** = *Helianthus annus*, **C** = *Cucurbita pepo* **D** = *Crotalaria juncea*, **E** =*Bombax ceiba*.
(c) **A** = *Hibiscus rosa sinensis,* **B** = *Crotolaria juncea,* **C** = *Bombax ceiba* **D** = *Helianthus annus,* **E** = *Cucurbita pepo*.
(d) **A** = *Hibiscus Rosa sinensis*, **B** = *Bombax ceiba* **C** = *Helianthus annus,* **D** = *Cucurbita pepo,* E = *Crotalaria juncea*.

Karnataka CET-2010

Ans. (c) : A = *Hibicus rosa sinensis*, **B** = *Crotalaria juncea*, **C** = *Bombax ceiba* **D** = *Helianthus annus,* **E** = *Cucurbita pepo*.

1022. The presence of corollary corona, sagittate anthers and dumb-bell shaped stigma are the characteristic fetaurs of

(a) *Hibiscus rosa sinensis*
(b) *Musa paradisiaca*
(c) *Ravenala madagascariensis*
(d) *Catheranthus roseus*

Karnataka CET-2010

Ans. (d) : *Catharanthus roseus* belong to apocynaceae family. It possesses corolla with corona, anthers cohesing or separate from one another, adnate. Stigma is bell–shaped (the head usually massively thickened contracted in the middle with a ring).

1023. Pappus helps in dispersal of pollen in:

(a) Asteraceae (b) Brassicaceae
(c) Malvaceae (d) Solanaceae

JIPMER-2016

Ans. (a) : In Asteraceae family, Pappus is a modified calyx. They have hairy structures that help in the dispersal of pollen by the wind that makes the seed light. dispersal of seed in Asteraceae family occurs by parachute mechanical.

1024. Source of commercial chewing gum latex is

(a) Hevea brasiliensis (b) Carica papaya
(c) Ficus elastica (d) Achras sapota

JIPMER-2016

Ans. (d) : Chewing gum is a salt substance designed to chewed without swallowed. The latex of some plants is commercially, important such as -

i. Source of commercial rubber is the latex of have a brasiliensis, ficus, elastica, cryptostegia, manihot.
ii. Source of enzyme papain is the latex of *Carica papaya.*
iii. Source of chewing or chewing gum is the latex of *Achvas sapota.*

1025. In which one of the family formation of endosperm doesn't take place?

(a) Orchidaceae (b) Cactaceae
(c) Ranunculaceae (d) Malvaceae

JIPMER-2016

Ans. (a): Some families like Orchidaceae and Trapaceae do not produce endosperm to nourish the developing embryo. Some plants like the orchid, lack endosperm in their seeds.

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1026. Which pair of the following plants represent, the condition of modification of stipules into spines?

(a) Euphorbia and Zizyphus
(b) Citrus and Euphorbia
(c) Zizyphus and Bougainvillae
(d) Bougainvillae and Citrus

AP EAMCET-2005

Ans. (a) : Spine or stipular spines are modified stipules present at the base of a leaf. Stipules are modified into spines in Zizyphus on Euphorbia.

- Spines are sharp and pointed structure. In Bougainvillae and citrus, a sharp and pointed structure is also present similar to the spines, named thorn which is the modification of axillary bud.

1027. Study the following lists:

	List-I (Taxon)		List-II (Number of chromosomes in the endosperm cells)
A.	*Pisum sativum*	1.	72
B.	*Oryza sativa*	2.	24
C.	*Nicotiana tabacum*	3.	60
D.	*Alium cepa*	4.	36
		5.	21

The correct match is:

	A	B	C	D
(a)	5	4	1	2
(b)	2	5	3	1
(c)	1	2	5	4
(d)	4	1	2	5

AP EAMCET-2005

Ans. (a) : In angiosperm endosperm is a triploid structure it is formed due to fusion of second male gamete (n) with the Secondary nucleus (24) all the given taxon are belong to angiospermic group hence their endospermic will contain three sets of their haploid number of chromosome (3n).

- Pea (*Pisum sativum*)(n=7) with contain endosperm with 21 (3n) chromosome.
- Rice (*Oryza sativa*)(n-12) will contain endosperm with 36 (3rd chromosome
- Tobacco *(Nicotiana tabacum*) (n=24) will contain endosperm with 72 (3n) chromosome and
- Onion (*Allium cepa*)(n=8) will contain endosperm with 24 (3n) chromosome.

1028. Which one of the following is used for external application in the cure of leprosy?

(a) Rice bran oil
(b) Neem seed oil
(c) Cotton seed oil
(d) Groundnut seed oil

AP EAMCET-2005

Ans. (b) : Neem seed oil is used for external application in the cure of leprosy.
Rice bran oil has gained a status as a 'heart-healthy oil'.
Ground nut oil is used to make medicine.
Cotton seed oil is ued for salad oil.

1029. Study the following lists:

	List-I		List-II
A.	Solanaceae	1.	Launea
B.	Malvaceae	2.	Pongamia
C.	Fabaceae	3.	Petunia
D.	Asteraceae	4.	Withania
		5.	Thespesia

The correct match is:

	A	B	C	D
(a)	3	4	1	2
(b)	2	5	1	4
(c)	4	5	2	1
(d)	5	2	3	4

AP EAMCET-2005

Ans. (c) : Withania is the member of family Solanaceae, **Thespesia** is the member of family Malvaceae. **Pongamia** is the member of family Fabaceae and **Launea** is the member of family Asteraceae.

1030. Study the following lists:

	List-I		List-II
A.	Tridax	1.	Synandrous
B.	Dolichos	2.	Monadelphous
C.	Ceiba	3.	Syngenesious
D.	Cucurbita	4.	Polyadelphous
		5.	Diadelphous

The correct match is:

	A	B	C	D
(a)	4	5	2	1
(b)	3	5	1	4
(c)	5	3	4	2
(d)	3	5	4	1

AP EAMCET-2005

Ans. (d) : In Tridax the androecium is polyadelphous (all anther remains free) in Dolichos, the androecium is Diadelphous i.e. two separate bundles of united filaments (anther are free) are formed. In ceiba, filament of all segment becomes fused and form a group but anther remains free. This situation is called mono-adelphous. In Cucurbita anther and filament both are fused throughout the whole length. This situation is known as **Synandrous**.

a) Tridax– Belongs to the family Asteraceae, it shows the syngenesious condition of the androecium, where in the anthers are fused and the filaments are free.

b) Dolichos– belongs to the family Fabaceae, it shows diadelphous androecium because filaments are united to form two bundles (9+2).

@apna_pdf

c) Ceiba– Belongs to the family Malvaceae, it shows polyadelphous condition because the united filaments form many bundles.

d) Cucurbita– Belongs to the family Cucurbitaceae, the androecium is synandrous because the stamens are united in their whole length as 2 + 2 + 1 pattern.

1031. Which one of the following is being tried in India as a biofuel substitute for fossil fuels?

(a) Musa (b) Aegilops
(c) Jatropha (d) Azadirachta

AIPMT-2008

Ans. (c) : Biofuels are the fuels extracted from the plants (biological sources) to be used in the replacement of fossil fuels to meet future need. Jatropha is used as a petro-plant due to its efficiency as fuel and easy availability and less pollution-causing properties.

Jatropha plant belongs to Euphorbiaceae family. The seeds of Jatropha contain an inedible oil which can be converted to biodiesel. The seed cake (residue left after extraction of oil from seeds) can be used as fertilizer or food for cattle. The biodiesel of Jatropha oil emits 80% less carbon dioxide on burning than other fuels.

1032. The fruit is chambered, developed from inferior ovary and has seeds with succulent testa in :

(a) Guava (b) Cucumber
(c) Pomegranate (d) Orange

AIPMT-2008

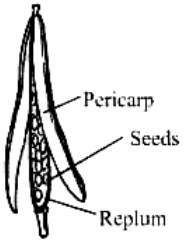
Ans. (c) : Pomegranate is the plant of family Lythraceae. The Pomegranate fruit is a berry which develops from an inferior ovary. Each seed has a surrounding water-laden pulp known as the edible sarcotesta that forms from the seed coat. The seeds have no arils (exarillate). **Aril:-** Accessory covering of certain seeds that commonly develops from the seed stalk **.** It is often a bright coloured fleshy envelope **e.g.** Litchi, Pomegranate.

1033. The Replum is present in the ovary of flower of:

(a) Sunflower (b) Pea
(c) Lemon (d) Mustard

AIPMT-2008

Ans. (d) : A false septum called replum develops between the two parietal placentae in mustard and other members of family Brassicacae. Mustard fruit is called siliqua. It develops from a Bicarpellary, Syncarpous, superior ovary which is unilocular but becomes bilocular due to Replum. It separates 2 valves of the fruit.



Siliqua of Mustard

1034. Most of the economically important fibre yielding plants belong to family

(a) Malvaceae (b) Solanaceae
(c) Cruciferae (d) Poaceae

JIPMER-2009

Ans. (a) : Most economically important fiber yielding plants belong to family malvaceae. It includes cotton, ladies finger etc. It is the most important fiber plant which supplies more than 70% of the world consumption of fibers.

1035. Plants like *Aegle marmelos, Ocimum sanctum* and *Ficus religeosa* are a group of plants designated as

(a) Traditional food crops
(b) Sacred species of plants
(c) Medicinal plant species
(d) Lesser known food plants

Karnataka CET-2008

Ans. (b) : Plants like *Aegle marmelos*, *Ocimum sanctum* and *Ficus religeosa* are a group of plants designated as sacred species of plants.

1036. An alkaloid called 'Reserpine' is extracted from

(a) Leaves of Sarpagandha
(b) Roots of Ashwagandha
(c) Leaves of Ashwagandha
(d) Roots of Sarpagandha

Karnataka CET-2008

Ans. (d) : An alkaloid called 'Reserpine' is extracted from roots of Sarpagandha. Reserpine is used to treat high blood pressure. It also used to treat severe agitation in patients with mental disorders.

1037. The fruit of Solanaceae is

(a) Berry or capsule (b) Pome
(c) Legume or pod (d) Drupe

UP CPMT-2005

Ans. (a): The fruits of the great majority of the Solanaceae are **berries or capsules and less often drupe**.

- A fruit consisting a fleshy enlarged receptacle and a tough central core containing the seeds e.g. an apple pear etc.
- Legume is also called pod fruit of plants in the pea family (Fabacea).
- A Drupe is a fruit with a hard stony covering enclosing the seed e.g. Peach or Olive.

1038. Rauwolfia serpentina is used in

(a) Curing high blood pressure
(b) Kidney failure
(c) Eye defect
(d) Diabetes

JIPMER-2014

Ans. (a) : *Rauwolfia serpentina* is used for hypertension. The plant was used by many physicians throughout India in the 1940s and then was used throughout the world in the 1950s, including in the United States and Canada.

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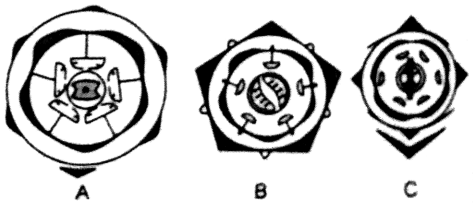
1039. Three floral diagrams are given here. Their respective families are assigned in the answer key. Find out the families to which these diagrams belong to



(A) ♀ $K_{pappus}C_{(5)}A_5G_{\underline{(2)}}$

(B) ♀ $K_{(5)}C_{(5)}A_5\underline{G}_{(2)}$

(C) ♀ $K_{2+2}C_4A_{2+4}G_{(2)}$

(a) A-Liliaceae, B-Asteraceae, C-Solanaceae
(b) A-Asteraceae, B-Solanaceae, C-Brassicaceae
(c) A- Brassicaceae, B-Solanaceae, C-Asteraceae
(d) A-Poaceae, B-Solanaceae, C-Asteraceae

JIPMER-2014

Ans. (b) : Floral diagram 'A' belongs to Asteraceae family. It is commonly known as Daisy or Sunflower family. Flowers are tubular or ligulate, bisexual or unisexual, usually dithecous, filament free with united anthers.
Floral diagram 'B' belong to Solanaceae family. It is commonly known as nightshade or potato family. It is one of human kind's most utilized and important family. Floral diagram 'C' belongs to Brassicaceae. It is commonly known as Crucifers or Cabbage family. These are generally herbs, annuals, biennials, or shrubs.

1040. Assertion (A): Dictyostele is present in rhizome of *Pteris vittata*.
Reason (R): Meristeles are scattered in the rhizome of *Pteris vittata*.
The correct answer is
(a) Both (A) and (R) is true and (R) is not the correct explanation of (A)
(b) (A) is true, but (R) is false
(c) (A) is false, but (R) is true
(d) Both (A) and (R) are true, and (R) is the correct explanation of (A) .

AP EAMCET-2013

Ans. (d): In the rhizome of *Pteris vittata* two types of stele present Dictyostele and Meristele. Meristele present in rhizome in scattered form.

1041. Match the following lists

	List I		List II
(A)	Bicarpellary unilocular	(i)	Hyoscyamus
(B)	Bicarpellary bilocular	(ii)	Ulex
(C)	Multicarpellary multilocular	(iii)	Scilla
(D)	Monocarpellary unilocular	(iv)	Citrus
		(v)	Capsicum

The correct match is

	A	B	C	D
(a)	(iii)	(v)	(iv)	(i)
(b)	(iv)	(i)	(iii)	(v)
(c)	(v)	(i)	(iv)	(ii)
(d)	(v)	(iii)	(i)	(ii)

AP EAMCET-2013

Ans. (a) : • **Scilla** has bicarpellary gynoecium with the unilocular ovary having two ovules.
• In **Capsicum** the gynoecium is bicarpellary with bilocular ovary.
• The gynoecium of **Citrus** is multicarpellary with multilocular ovary.
• **Hyoscymus** shows monocarpellary gynoecium with unilocular ovary.

1042. Triple fusion was discovered in this plant possessing naked bulb, fleshy leaf bases and loculicidal capsule.
(a) Lilium (b) Trillium
(c) Aloe (d) Allium

AP EAMCET-2013

Ans. (a) : Lilium is herbaceous plants having scaly bulbs, whorled or scattered leaves, perianth of six segments, versatile anthers,
(b) **Trillium** - Red Trillium has long been used to **relive respiratory distess**, specifically because it acts as expectorant, helping to remove phlegm or mucus from the respiratory fracts. This can help to speed up the healing process of colds and also protect the immune system against the pathogens that often thrive in mucus.
(c) **Aloe** – Aloevera is a succulent plant species. Aloe is widely distributed, and is considered an invasive species in many would regions.
(d) **Allium** – Allium is a **genus of monocotyledonous Flowering plants** that included hundreds of species, including the cultivated Onion, Garlic, Scallions, Shallot, Leek, and Chives.

1043. Identify the correct combination of characters found in Cucurbita.
(a) Free central placentation, synandry, divergent palmately reticulate venation
(b) Mesogamy, fusion of epicarp and thalamus to form rind of the fruit, seed germination epigeal
(c) Axile placentation extrafloral nectaries continuous, collenchymatous hypodermal ring in stem
(d) Bicarpellary gynoecium, compound sieve plate, unilocular ovary

AP EAMCET-2013

Ans. (b) : In **Cucurbita**, Pollen tube enters the ovule through the integuments. In Cucurbit (mesogamy), the epicarp and thalamus form the outer ring of the fruit Also, seed germination is epigeal.

1044. Match the following lists.

	List I	List II
(A)	Apices of underground branches store food material	(i) Mentha
(B)	Underground branches grow obliquely upward from the axillary buds of nodes of the stem below the soil	(ii) Hydrocotyle
(C)	Aerial branches grow obliquely downwards and produce adventitious root after touching the soil	(iii) Agave

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(D) Weak stemmed plants have a cluster of leaves and root at every node — (iv) Stachys

(v) Jasminum

The correct match is

	A	B	C	D
(a)	(ii)	(v)	(i)	(iii)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(v)	(iii)	(ii)
(d)	(iv)	(i)	(v)	(ii)

AP EAMCET-2013

Ans. (d) :
(i) **Mentha**-Undergrond branches grow obliquely upward from the axillary buds of nodes of the stem below the soil.
(ii) **Hydrocotyle**-Weak stemmed plants have a duster of leafs and roots at every node
(iii) **Agave-** Agave is a genus of monocots native to the hot and arid regions of the Americas, Plants in the genus may be considered perennial because they require too many years to mature and flower.
(iv) **Stachys**- Apices of underground branches store food
(v) **Jasminum**-Aerial branches grow obliquely down wards and produce adventitious roots after touching the soil.

1045. Tetradynamous condition of androecium is characteristic feature of family
(a) Solanaceae (b) Brassicaceae
(c) Compositae (d) Malvaceae

UP CPMT-2014

Ans. (b): Tetradynamous condition is unique feature of family Brassicaceae. In this condition the stamens are arranged in two whorls, the outer whorl has to short stamens while the inner whorl has four long stamens.

1046. Respiratory roots, positively aerotropic structure in mangroves are found in plant/plants
(a) Sonneratia (b) Aviccinia
(c) Rhizophora (d) All of the above

UP CPMT-2014

Ans. (d): Respiratory roots (pneumatophores) are characteristics feature of Mangroves marshy plants halophytes, Sonneratia, Aviccinia and Rhizophora all are mangroves vegetation.

1047. The fruit found in plants of family-Poaceae
(a) Cypsela (b) Caryopsis
(c) Pod or legume (d) Siliqua

UP CPMT-2014

Ans. (b): Poaceae or grass family is also known as Graminae. fruit of this family is caryopsis.
• This fruit is one chambered and one seeded fruit and develop from a superior monocarpellary ovary.
Hence, the pericarp remain fused with seed coat.
• **Cypsela –** Cypsela is a characteristic fruit of the family Asteraceae. It is a small simple seeded, dry fruit and it develops from the bicarpellary.
• **Legume or pod** – Legume refers to any plant from the Fabaceae family that would include its leaves, stems and pods and mostly dehiscent type of fruit.
• **Siliqua** – Siliqua fruit is characteristic of the family Brassicaceae. Siliqua is a type of fruit (seed capsule) having two fused carpel with the length being more than three times the width.

1048. Ruminate endosperm is found in the seeds of family
(a) Compositae (b) Cruciferae
(c) Euphorbiaceae (d) Annonaceae

UP CPMT-2011

Ans. (d): Mature endosperm with any degree of irregularity and unevenness in its surface contour is called ruminate endosperm. It is known to occur in about 32 families of angiosperm. In family-Annonaceae ruminate endosperm is found.
• The members of Asteraceae produce a type of fruit called an achene which is dry and single-seeded and does not open at maturity.
• The Euphorbiaceae the spurge family are a large family of flowering plant.

1049. In the members of family Malvaceae, anthers are described as
(a) Diadelphous and dithecous
(b) Diadelphous and monothecous
(c) Monoadelphous and dithecous
(d) Monoadelphous and monothecous

Karnataka CET-2006

Ans. (d) : The androecium of the family malvaceae consists of indefinite stamens. The stamens are monoadelphous i.e. united into one bundle by filaments and monothecous i.e. single called anther. The anther dehiscent transversely.

1050. Study the following lists

List I		**List II**
(A) Spongy aril	**1.**	**Jussiaea**
(B) Multiple epidermis	**2.**	**Pistia**
(C) Respiratory roots	**3.**	**Nerium**
(D) Root pockets	**4.**	**Sagittaria**
	5.	**Nymphaea**

The correct match is

	A	B	C	D
(a)	1	3	2	5
(b)	2	1	4	3
(c)	4	2	3	1
(d)	5	3	1	2

AP EAMCET-2009

Ans. (d) : • Spongy aril is found in Nymphaea.
• Multiple epidermis is found in xerophytic plants like Nerium.
• Root floats or floating roots are found in Jussiaea and helping gaseous exchange from atmosphere (i.e. Respiratory roots).
• In Pistia, root floats are helpful in respiration and balancing and bear root pocket.

1051. A plant with actinomorphic and hypogynous flowers, heterochlamydeous perianth, dorsifixed and extrorse anthers dehiscing transversely belongs to
(a) Coronariae (b) Bicarpellatae
(c) Thalamiflorae (d) Calyciflorae

AP EAMCET-2009

Ans. (c) : Ranunculaceae flower are hypogynous. polycarpellary and dorsifixed anthers, apocarpous, Flower is pedicellate, ebracteate and hermaphrodite, actinomorphic flowers, extrose anther exhibit transverse dehiscence.

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1052. Study the following table

(i)Modified aerial stem	**Unisexual flowers develop acropetally**	**Chalazal entry of pollen tube**
(ii)Flowers achlamydeous	**Pedicels of all the flowers are of same length**	**Presence of false whorl**
(iii) Cohesion of bracts forming a cup	**Centrifugal opening of flowers**	**Male flowers many**
(iv) Flower formation on one side in a spiral manner	**Presence of Rachilla**	**Terminal part of the peduncle is flowerless**

Select the correct pair of answers in which the former represents the set of characters present in Poinsettia and the latter in the pair represents the set of characters present in Casuarina.

(a) (ii), (iii) (b) (i), (ii)
(c) (iv), (iii) (d) (iii), (i)

AP EAMCET-2009

Ans. (d) : In Poinsettia and Euphorbia inflorescence is **cyathium**, in which involucre fuse to form a cup surrounding a large achlamydeous, pedicellate tricarpellary, syncarpus female flower. Numerous centrifugally arranged male flowers surround the single female flower.

• In Casuarina, cylindrical phylloclades are found which are modified aerial stems, flowers are unisexual which develop acropetally and pollen tube enters the ovule through chalazal tissues, i.e. chalazogamy.

1053. Quinine used for treatment of malarial fever extracted from

(a) Atropa belladona
(b) Cinchona officinalis
(c) Aconitum napellus
(d) Rauwolffia serpentina

UP CPMT-2006

Ans. (b) : Quinine is obtained from the bark of *Cinchona officinalis* (family Rubiaceae). The bark of this plant contain about 30 alkaloids, used for treatment of malarial fever.

***Atropa belladonna*-** Belladonna has been used in herbal medicine for centuries as a pain reliever, muscle relaxer, and anti-inflammatory, and to treat menstrual cycle.

***Aconitum napellus* -** If given at the beginning of an illness, *Aconitum napellus* can often stop an illness from progressing. This medicine is used to treat the initial stages of crop, urinary tract infection, scarlatiniform viral exanthemas, otitis media and influenza, among other conditions.

***Rauwolfia sarpentina* -** *Rauwolfia sarpentina* is a safe and effective treatment for hypertension.

1054. Carthamus belongs to family

(a) compositae (b) gramineae
(c) liliaceae (d) solanaceae

UP CPMT-2006

Ans. (a): *Carthamus tinctorius* (kusum) belongs to family Compositae. Its flower is use as due for dying food and cloth. The seed oil used for making soaps, varnishes, paints and burning purpose. Refined edible oil is also produced by hydrogenation and bleaching.

1055. An example for holandric inheritance is:

(a) epidermolysis (b) Turner's syndrome
(c) haemophilia (d) webbed toes

AP EAMCET-2002
JCECE-2002

Ans. (d) : Holandric inheritance is the inheritance of genes present the y - chromosome. Hypertrichasis of the ears, webbed toes ancl porcupine man are examples of y - linked inheritance.

1056. Barr body is present in

(a) sperm
(b) ovum
(c) somatic cell of female
(d) somatic cell of male

AFMC-2010

Ans. (c) : Bar body is a structure consisting of condersed x - chromosome that is found in non dividing nuclei of female mammals, is, somatic cells of female.

1057. Match the terms in Column I with their description in Column II and choose the correct option

Column I		Column II	
(A)	**Dominance**	**(i)**	**Many genes govern a single character**
(B)	**Codominance**	**(ii)**	**In a heterozygous organism only one allele expresses itself**
(C)	**Pleiotropy**	**(iii)**	**a heterozygous organism both alleles express themselves fully**
(D)	**Polygenic inheritance**	**(iv)**	**A single gene influences many characters**

	(A)	(B)	(C)	(D)
(a)	(iv)	(iii)	(i)	(ii)
(b)	(ii)	(i)	(iv)	(iii)
(c)	(ii)	(iii)	(iv)	(i)
(d)	(iv)	(i)	(ii)	(iii)

NEET-2016 Phase-I

Ans. (c) : The correct option is (c) 1-ii, 2-iii, 3-iv, 4-i.
Dominance- In a heterozyous organism only one allele expresses itself.
Codominance- In a heterozygous organism both alleles express themselves fully.
Pleiotropy- A single gene influences many characters.
Polygenic Inheritance- Many genes govern a single characters.
In heterozygous only one allele is express.

1058. Test cross in plants or in Drosophila involves crossing

(a) between two genotypes with dominant trait
(b) between two genotypes with recessive trait
(c) between two F_1 hybrids
(d) the F_1 hybrid with a double recessive genotype

AIPMT (Mains)-2011

Ans. (d) : When we study about 'Mendelian factor' in Drosophilla then we found a test cross is a experimental cross of an individual organism from parent F_1-generation dominant homozygous to recessive genotype and phenotype contrasting characteristic feature.

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06 ANATOMY OF FLOWERING PLANTS

A. Tissue

1. Which of the following statements are incorrect regarding internal organization of plant tissues?

A. Phloem parenchyma is absent in dicotyledonous stem
B. Monocot roots do not undergo secondary growth
C. Hypodermis is sclerenchymatous in monocotyledonous stem
D. Lysigenous cavities are found in vascular bundles of dicotyledonous stem

(a) AB (b) AC
(c) BC (d) AD

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : Phloem parenchyma is absent in monocot stem. In dicot stem phloem parenchyma is present.
• Lysigenous cavity is absent in vascular bundle of dicot stem. Lysigenous are present in monocot stem like zea maize and other monocots.

2. The hypodermis tissues in dicot and monocot stems respectively

(a) Collenchyma and Sclerenchyma.
(b) Sclerenchyma and Collenchyma.
(c) Sclerenchyma in both.
(d) Collenchyma in both.

AP EAPCET-22.05.2023, Shift-II

Ans. (a) : Hypodermis is collenchymatous (green) in dicot stem and sclerenchymatous (non green) in monocot stem.

3. Correct sequence of the development process in a plant cell

(a) Meristematic cell → Expansion → Differentiation → Maturation
(b) Meristematic cell → Cell division → Plasmatic growth → Maturation
(c) Meristematic cell → Maturation → Elongation → senescence
(d) Mature cell → Cell division → Meristematic cell → Differentiation

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : The developmental process in plant cell starts from meristematic activity then divided cell growth and expansion and show differentiation and then it gets matured.

4. Match List-I with List-II.

List-I		List-II	
(A)	**Cells with active cell division capacity**	**(i)**	**Vascular tissues**
(B)	**Tissue having all cells similar in structure and function**	**(ii)**	**Meristematic tissue**
(C)	**Tissue having different types of cells**	**(iii)**	**Sclereids**
(D)	**Dead cells with highly thickened walls and narrow lumen**	**(iv)**	**Simple tissue**

Select the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(iii)	(ii)	(iv)	(i)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(i)	(ii)	(iii)	(iv)

NEET-2021

Ans. (b) :

(A)	Cells with active cell division capacity	(ii)	Meristematic tissue
(B)	Tissue having all cells similar in structure and function	(iv)	sample tissue
(C)	Tissue having different types of cells	(i)	vascular tissues
(D)	Dead cell with highly thickened walls and narrow lumen	(iii)	sclereids

5. Irregularly arranged vascular bundles within the ground tissue are called

(a) actinostele (b) radial stele
(c) atactostele (d) plectostele

Tripura JEE-2019

Ans. (c) : Irregularly arranged vascular bundles within the ground tissue are called. 'Atactostele'. It consits of vascular bundles scattered in ground tissue. It is found in monocots. Atactostele occurs in the stem of monocots but eustele occurs in the stem of dicots. It consists a sclerenchymatous bundle sheath and only two meta xylem elements are present per vascular bundle.

6. Structurally the amphicribal vascular bundles resemble closely to

(a) dictyosteles (b) solanosteles
(c) siphonosteles (d) protostele

CMC Vellore-2013

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Ans. (d) : Structurally the amphicribal vascular bundles resemble closely to protostele. Amphicribal vascular bundle is a central strand of xylem in a bundle and is surrounded by phloem. It is structurally resemble close to protostele.

7. Which one of the following is a secretory tissue ?

(a) Sclerenchyma (b) Companion cells
(c) Hydathode (d) Sclereids

BVP-2006

Ans. (c) : Secretory tissues take place in most vascular plants. Some of these tissues like hydathodes , salt glands and nectarines, secrete unmodified or only slightly modified materials that is supplied directly or indirectly by the vascular tissues.

Hydathodes are secretory structures which are a modification of tissues of leaves, present on tips and margins that discharge water from the interior of the leaf to the surface in a process known as guttation.

8. Transfusion tissue is meant for translocation of

(a) Organic solutes (b) Sap
(c) Food materials (d) All of these

CMC Vellore-2011

Ans. (a) : Transfusion tissue is meant for translocation of organic solutes. The primary function of transfusion is to move substances between the mesophyll and the vascular bundles which performs the function of lateral veins.

9. Chlorenchyma is known to develop in the

(a) Spore capsule of a moss
(b) Pollen tube of pinus
(c) Cytoplasm of chlorella
(d) Mycellium of a green mould such a Aspergillus

MGIMS Wardha-2010

Ans. (a) : Chlorenchyma is known to develop in spore capsule of a mass. Parenchyma cells in leaves which contain chloroplasts are termed as chlorenchyma cell. They help the leaves to produce food by photosynthesis and storage of the food produced. These chloroplast bearing cells have the capacity to prepare food through photosynthesis.

10. Angular collenchyma occurs in

(a) Salvia (b) Helianthus
(c) Althaea (d) Cucurbita

SJIPMER-2013

Ans. (d) : Angular collenchyma is found in cucurbita'. Angular collenchyma is a type of collenchyma in which the material that causes thickening is deposited at angles or corners of the cell. Pumpkin and melon are examples of fruits that belong to this genus.

11. Velamen is found in :

(a) Vanda (b) Rosa
(c) Viscum (d) Santahim

Manipal-2004

Ans. (a) : Velamen is found in 'Vanda'. Velamen is a spongy, multiple epidermis that covers the roots of some epiphytic or semi epiphytic plants, such as orchids or Vanda. Vanda is a genus in the orchid family orchidaceae. It is tissue that is found in the aerial roots of some orchids/Vanda.

12. Phytotron is :

(a) a controlled condition chamber for tissue
(b) leaf culture process
(c) special culture of plants
(d) root culture process

MGIMS Wardha-2005

Ans. (a) : Phytotron is a controlled condition chamber for tissue. It is a device, or chamber in which plants can be grown under a controlled conditions.

Hence, the (a) option is a correct answer,

13. How many tissue systems are suggested by Sachs:

(a) two (b) three
(c) four (d) five

Uttarakhand-2005

Ans. (b) : By 'Sachs' the three tissue systems are suggested. Julius von Sachs classifies the tissue system in plants. on the basis of the structure and location. There are three types of tissue system found in plants-epidermal tissue system, ground tissue system and Vascular or conducting tissue system. In 1975, it was proposed by Sachs.

14. Quiescent centre theory was proposed by :

(a) Nagelli (b) Schmidt
(c) Hanstein (d) Clowes

Haryana PMT-2004
Manipal-2003

Ans. (d) : Quiescent centre theory was proposed by 'Clowes'. The quiescent centre in the root apical meristem is ubiquitous in vascular plants and positioned between the active meristematic region and root cap. It is sometimes also referred to as the cytogenetic centre or constructional center or ontogenetic centre. It may be absent in seedless vascular plants.

15. The branch that deals with the study of trees is:

(a) Pomology (b) Anthology
(c) Dendrology (d) Palynology

Haryana PMT-2003

Ans. (c) : The branch that deals with the study of trees of called 'Dendrology' Dendrology or xylology is the science and study of woody plants, specifically their taxonomic classifications. Carolous Linnaeus is known as father of dendrology. Trees and plants are identified by many characteristic including bark 'flowers' fruits and seeds, buds etc.

16. This is a specialized tissue found in the mesophyll of Cycas and Pinus leaves

(a) Spongy tissue (b) Palisade tissue
(c) Conjunctive tissue (d) Transfusion tissue

J&K CET-2007

Ans. (d) : In cycas and Pinus leaves transfusion tissue is found in the mesophyll of both. Transfusion tissue is the substitute of lateral veins as it helps in the conduction of water. This tissue is found around. The vascular bundles of gymnosperms leaves these are helpful for conduction of water in the leaflets of cycas and Pinus.

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B. Meristemetic Tissue

17. Virus free plants are obtained in 'Invitro' through

(a) Roots (b) Shoots
(c) Meristems (d) Ovules

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : The plant is infected with a virus, the meristem is free from virus. Hence, tissues from apical and axillary meristem can be used to obtain virus-free plants in in-vitro plant tissue culture.

18. Axillary buds which forms branches or flowers are present in

(a) Lateral meristem
(b) Apical meristem
(c) Cylindrical meristem
(d) Intercalary meristem

AP EAMCET-25.09.2020 Shift-II

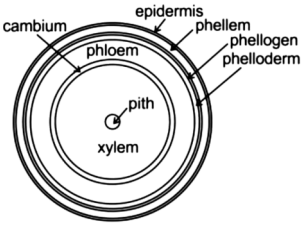
Ans. (b) : Axillary buds which forms branches or flowers are present in 'Apical meristem'. Apical meristem refers to the meristem that occurs at the tips of roots, stems and branches, which bring about the primary growth of the plants.
Thus, Axillary buds and terminal bud both are derived from the activity of apical meristem.

19. Which of the following statements about cork cambium is incorrect?

(a) It is a couple of layers thick
(b) It forms secondary cortex on its outerside
(c) It forms a part of periderm
(d) It is responsible for the formation of lenticels

NEET-2020 Phase-II

Ans. (b) : Cork cambium is a meristematic tissue involved in secondary growth. It is also called phellogen. It develops in the cortex region. It is few layers thick and it cut off cells into outer layer and inner layer the former differentiates into cork (phellem) while latter differentiate into secondary cortex (phelloderm). All these three layers phellogen, phellem and phelloderm are collectively called as periderm. In woody trees, the phellogen cut off closely arranged parenchymatous cells, rupturing the epidermal cell to form lenticles. Pericycle also becomes meristematic to form cork cambium.



20. Regeneration of damaged growing grass following grazing is largely due to :

(a) Secondary meristem
(b) Lateral meristem
(c) Apical meristem
(d) Intercalary meristem

NEET (Odisha)-2019

Ans. (d) : Regeneration of damaged growing grass grazing is largely because Intercalary meristems. These are found in grasses, where they help to regenerate the parts removed by the grazing herbivores. As apical meristems and intercalary meristems, both constitute primary meristems because they appear early in life and contribute to the formation of the primary plant body.

21. Assertion (A): Grasses get regenerated even after grazed by herbivores
Reason (R): In grasses meristems are present in between mature tissues,
Options:

(a) (A) and (R) are true and (R) is the correct explanation of (A).
(b) (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

AP EAMCET-25.04.2018 Shift-II

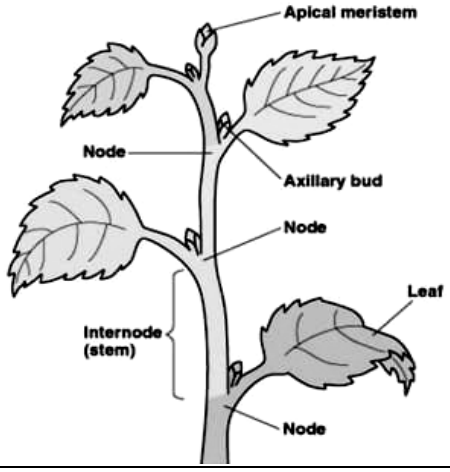
Ans. (a): The grass stem regenerates after grazing due to intercalary meristem because this helps in regeneration of stem in grasses removed by grazing herbivores.

22. Axillary bud and terminal bud are derived from the activity of : -

(a) Lateral meristem
(b) Intercalary meristem
(c) Apical meristem
(d) Parenchyma

Rajasthan PMT-2007
AIPMT-2002

Ans. (c) : Meristem is the group of actively dividing cells that give rise to the side to the new cells after division.
Apical meristems are situated at the tip of root and shoot of the plants. They take place initial growth. Plants elongate and increase in light as a result of division in the meristem.



23. Maximum amount of growth in root occurs

(a) in the presence of light
(b) at its apex
(c) behind the apex
(d) in the presence of soil

Uttarakhand PMT-2011

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Ans. (c) : The root apical meristem or root apex, is a small region at the tip of a root in which all cells are capable of repeated division and from which all primary root tissue are derived. Apex portion root is made up of protective tissue and root cap and region of cell division it situated below the tap root cap so maximum growth in root takes place behind the apex not in tip.

24. Meristem, which produces vascular bundles, is

(a) procambium
(b) lateral meristem
(c) secondary meristem
(d) mass meristem

Uttarakhand PMT-2011

Ans. (a) : Meristem, which produces vascular bundles, is procambium. The procambium can be defined as a type of meristematic tissue present in the plant. True combium provides the plants with primary tissues of the vascular bundle. It generates new vascular tissues in the plant.

25. Dermatogen, periblem and plerome are

(a) permanent tissues
(b) meristematic tissues
(c) intercalary tissues
(d) secondary tissue

CMC Vellore-2013

Ans. (b) : According to scientist, "Johannes Von Hanstein," tissues of the root is divided into three major parts. (1) vascular cylinder, (2) cortex (3) epidermis. Which is derived from three groups of meristematic cells. Meristematic tissue consists of the cells which have the ability to divide and redivide to form new cells. Dermatogen, periblem, and plerome are meristematic tissues.

- Dermatogen (outermost layer) gives rise to the epidermis.
- Periblem (middle layer) that gives rise to hypodermis, cortex, and endodermis.
- Plerome (innermost layer) that gives rise to vascular tissue including pith.

26. Which is true for meristematic tissue?

(a) Their cells have dense cytoplasm and prominent nuclei
(b) Their cells are dead with large inter cellular spaces
(c) These are usually modified for storage
(d) Their cells are most primitive, living and without nuclei

BVP-2005

Ans. (a) : Meristematic tissues are responsible for overall growth and repair of the plants. Their cells have a thin cell wall, prominent nucleus, abundant cytoplasm, and are tightly arranged without vacuoles. These cells are continuously dividing resulting in overall growth and repair. Hence, these cells have dense cytoplasm and a prominent nucleus for controlling their activities.

27. Decapitation of plant leads to the activation of axillary buds due to

(a) increase in cytokinins
(b) more light availability
(c) auxin translocation
(d) all of these

AIIMS-1995

Ans. (c) : At the tip of stem, maximum content of auxin are found. It is responsible for apical dominance (suppression of lateral buds). Decapitation results in translocation of auxins towards lower side. Therefore, lateral buds (axillary buds) get activated.

28. Cambium of root is an example of:

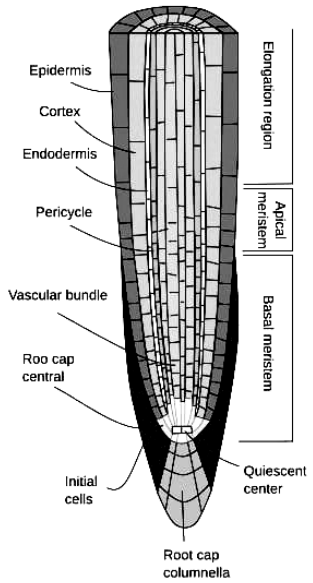
(a) Apical meristem
(b) Intercalary meristem
(c) Primary meristem
(d) Secondary meristem

AIIMS-2000

Ans. (d) : There are two tissues that are responsible for the secondary growth in plants-vascular cambium and cork cambium. In roots, cambium is derived from secondary meristem.

Vascular cambium and cork cambium are secondary meristems that are formed in stems and roots after the tissues of primary plant body have differentiated. Vascular cambium produces secondary xylem and secondary phloem later an leads to wood formation in plants.

Cork cambium which give rise to the periderm which replace the epidermis.



29. The apical meristem of the root is present

(a) Only in radicals
(b) Only in tap roots
(c) Only in adventitious roots
(d) In all the roots

AIPMT-2003

Ans. (d): Root apical meristem present in all roots. RAM provides the meristematic cells for the future root growth while the shoot apical meristem (SAM) gives rise to organs like the leaves and flowers.

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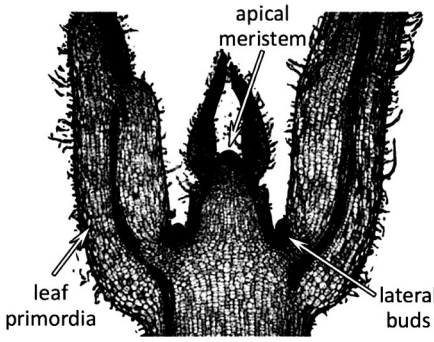

30. Best material for the study of mitosis in laboratory is: -
(a) Anther (b) Root tip
(c) Leaf tip (d) Ovary

AIPMT-2002

Ans. (b) : Best material for the study of mitosis in laboratory is root tip.
Root tip have active meristematic zone where cells divide mitotically leading increase in length of the root.
Example:- *Allium cepa* root tip.

31. Which of the following plant cells will show totipotency?
(a) Sieve tubes (b) Xylem vessels
(c) Meristem (d) Cork cells

JCECE-2014
AFMC-2000
AIPMT-1993

Ans. (c) : Totipotency is the ability in which cells can get specialized into any type of cells. Meristems shows the totipotency because xylem vessels and cork cell are dead while sieve tube cells do not possess nuclei. The primary meristem present from the beginning and throughout the life.

32. Mowing grass lawn facilitates better maintenance because
(a) wounding stimulates regeneration
(b) removal of apical dominance and stimulation of intercalary meristem
(c) removal of apical dominance
(d) removal of apical dominance and promotion of lateral meristem.

AIPMT-1989

Ans. (b) : Apical dominance occur in the presence of auxin and it is a common observation in vascular plants. If apical meristem is intact and growing, the growth of lateral tips is suppressed. According to Thimann and skoog the auxin, synthesized in apical meristem, is translocated downwords and inhibits the growth of lateral tips. That is why moving grass lawns facilitate better maintenance because of removal of apical dominance and stimulation of intercalary meristem.

33. The meristem, which develops into a primary vascular tissue is
(a) protonema (b) promeristem
(c) ground meristem (d) procambium

CG PMT-2005

Ans. (d) : Procambium – It occurs below the protoderm and gives rise primary xylem, primary phloem and intrafascicular cambium.

34. Lateral root orginates from:
(a) endodermis (b) pericycle
(c) cortex (d) phloem

DUMET-2003

Ans. (b) : The tap root develops from the redicle part of the seed. The direct prolongation of the radicle form the primary root, from which aries **lateral root** of different order as – primary, secondry and tertiary roots.
Lateral roots are endogenous in origin i.e. – **aries from the pericyle.**

35. Meristematic cells have:
(a) thick cell wall and large intercellular spaces
(b) thick cell wall and no intercellular spaces
(c) thin cell wall and large intercellular spaces
(d) thin cell wall and no intercellular spaces

Manipal-2005

Ans. (d) : Meristematic cells have thin cell wall without intercellular spaces as they keep actively dividing. Meristematic cells are dense cytoplasm, small vacuoles and large nucleus. Meristematic cell walls are thin and made up of primary cell wall containing cellulose.

36. Quiescent centre is a :
(a) weak zone (b) active zone
(c) inactive zone (d) strong base

Manipal-2005

Ans. (c) : Quiscent center concept – This concept was given by **Clowes** and discovered in *Zea maize* plant.
Present in the root. It is cap like or hemicircular group of cells between dermatogens and calyptrogen or between, active meristem and root cap **cells are inactive or less active** have low amount of DNA, RNA and protein, light cytoplasm and small nuclei, but may be made active when active tissue damage thus act as reservoir and produce active initial.

37. The histogens are classified on the basis of :
(a) cells they contain
(b) cells they give rise to future tissue
(c) meristematic activity
(d) cell division

Manipal-2005

Ans. (b) : Root apical meristem consist of three cell initiating region called histogen. Which classify into three parts. Dermatogen which form epidermis, periblem form cortex and plerome forms vascular bundle.

38. Viral infection is usually absent in
(a) phloem cells (b) xylem cells
(c) pith cells (d) apical meristem

VMMC-2009

Ans. (d) : Generally, plant shoot apical meristems are virus free. This is because the spread of virus in the plant tissue does not keep up (is slow) with the fast meristem growth if it is actively producing new leaves/flowers.
Apical meristem located at the tip of shoot and root. It is primary meristem responsible for primary growth i.e. Growth in length.

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39. The meristem that is parallel to the longitudinal axis of the plant is
(a) procambium
(b) intercalary meristem
(c) phellogen
(d) apical meristem

J&K CET-2010

Ans. (c) : Phellogen is also famous as cork cambium which is a lateral meristem. It increases the girth of the plant and parallel to the longitudinal axis of the plant which is responsible for the development of the periderm. There are cells that grow inwards from there called phelloderm whereas the cells develop outward are known as phellem.
Phellem is composed of dead cells and protective in function.

40. Who proposed the histogen theory?
(a) Schmidt (b) Hanstein
(c) Nageli (d) Mankey

Rajasthan PMT-1995

Ans. (b) : The Histogen theory was proposed by Hanstein and supported by Strasburger.
According to this theory histogen divided into three layer.
Dermatogen – It is outermost single layered cells divide anticlinally which gives rise Epidermis in Shoot apex and Epiblema in root apex.
Periblema – Occurs between the dermatogens and plerome, multilayered. It gives. Hypodermis, general cortex and endodermis of shoot apex and root apex.
Plerome – Occurs in the center and gives rise stele e.g. Pericycle, primary vascular bundle, pith and pith rays.

41. Growth of stem in diameter is due to
(a) secondary growth
(b) lateral meristem
(c) apical meristem
(d) intercalary meristem

MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (b) : A lateral meristem is a meristem that runs parallel to the sides of an organ. The radial section of the stem or root has a lateral meristem. The lateral meristem is responsible for the plants thickness. The increase in diameter of a plant's stem and root is caused by cork cambium and vascular cambium. They can be found in dicot plants. These are the lateral meristems, which are in charge of the plant's secondary growth

42. The quiescent centre in root meristem serves as a
(a) site for storage of food, which is utilised during maturation
(b) reservoir of growth hormones
(c) reserve for replenishment of damaged cells of the meristem
(d) region for absorption of water

JIPMER-2011

Ans. (c) : Quiescent centre have low rate of cell division. So, it replenishes the damaged cells. It is found an the tip of growing roots.

43. Quiescent centre is present in:
(a) shoot apex (b) root apex
(c) both a and b (d) meristematic tissue

Rajasthan PMT-2005

Ans. (b) : The quiescent center is present in the root apex. It is cap like or hemicircular group of cells between dermatogens and calyptrogen or between, active meristem and root cap **cells are inactive or less active** have low amount of DNA, RNA and protein, light cytoplasm and small nuclei, but may be made active, when active tissues damaged thus act as reservoir and produce active initial.

44. Wound healing is due to
(a) ventral meristem
(b) secondary meristem
(c) primary meristem
(d) All of these

JIPMER-2013

Ans. (b) : Secondary meristem is a type of meristematic tissue which is responsible for the secondary growth in plants and produce growth in thickness. Healing of wounds in plants take place by the activity of secondary meristem.

45. Portion of apical meristem that gives rise to xylem tissue is called
(a) Protoxylem (b) Procambium
(c) Metaxylem (d) Tracheid

WB JEE-2012

Ans. (b) : Portion of apical meristem that gives rise to xylem tissue is called 'procambium'. The procambium gives rise to vascular tissues, including the primary xylem and primary phloem.

46. Which of the following is the region of cell division?
(a) Root cap
(b) meristematic region
(c) Root hair zone
(d) None of these

Rajasthan PMT-2004

Ans. (b) : Meristematic cells are responsible for the root and shoot growth of plants These cells have the ability of divide and increase in number and increase the length as well as the girth of the stem and root. Meristematic tissues are cells or group of cells that have the ability to divide. The cells present in these tissues constantly divide to produce new cells.

47. Meristematic cells are
(a) thin-walled, less protoplasmic, isodiametric and nucleated
(b) thin-walled, densely protoplasmic, isodiametric and nucleated
(c) thick-walled, less protoplasmic, isodiametric and nucleated
(d) thick-walled, densely protoplasmic, isodiametric and non-nucleated

BVP-2010

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Ans. (b) : Meristematic cells are thin walled, densely protoplasmic, isodiametric and nucleated. These cells are undifferentiated or incompletely differentiated. They have a dense cytoplasm with a prominent nucleus. They are compactly arranged cells with no intercellular spaces.

48. Girth development is due to

(a) intercalary meristem
(b) lateral meristem
(c) apical meristem
(d) plate meristem

UP CPMT-2010
AIPMT-1988

Ans. (b) : Girth development is due to lateral meristem tissue Lateral meristem (cambium) is situated at the bark and it is responsible for the increase in the girth of the stem or root. The lateral meristem includes cambium which is responsible for the secondary growth of the plant Hence, the girth of the stem increases due to the lateral meristem tissues. Lateral meristem are found in woody plants.

49. Meristematic tissue are

(a) premature having ability of division
(b) mature does not have ability of division
(c) premature not having ability of division
(d) complex differentiating in xylem, phloem and cambium

DUMET-2005
UP CPMT-2003

Ans. (a) : Meristematic tissue are premature having ability of division. These tissues contain living cells with varied shapes. They possess a large nucleus divided by the vacuole. The cell have no intercellular space. This tissues heal the wounds of an injured plant. They possess a single large and prominent nucleus. The meristematic tissue has the quality of self renewal.

50. Which type of meristems allow the fallen stem of cereals/grasses to become erect?

(a) Apical meristem
(b) Lateral meristem
(c) Intercalary meristem
(d) Secondary meristem

MGIMS Wardha-2007

Ans. (c) : 'Intercalary meristem' allow the fallen stem of cereals/grasses to become erect. Intercalary meristem helps in elongation of plant organs and also allow fallen stem of cereals to become erect. This meristem maintains the growth in the internodal region when the cereal stem is lodged, its growth re-occurs due to the meristematic activity of the intercalary meristem.

51. To promote the growth of lateral branches of a plant:

(a) axillary buds are removed
(b) apical bud is removed
(c) auxin is applied to the apical bud
(d) auxin is applied to the decapitated shoot tip

Karnataka CET-2002

Ans. (b) : To promote the growth of lateral branches of a plant- apical bud is removed. During the apical bud of removing, the IAA concentration lowers and allows the lateral buds to grow. It produces new shoots, which compete to become the lead growth. It results in the growth of lateral branches.

52. Viral infection is usually absent in

(a) Phloem cells (b) Xylem cells
(c) Pith cells (d) Apical meristem

BHU PMT (Screening)-2009
Uttarakhand PMT-2009

Ans. (d) : Viral infection is usually absent in 'Apical meristem', Apical meristems are virus free. This is because the spread of virus in the plant tissue does not keep up with the fast meristem growth. If it is actively producing new leaves/flowers. Meristem cells divide at a faster rate than the permanent tissues like pith, phloem and xylem, viruses are unable to divide in them.

53. The length of different internodes in a culm of sugarcane is variable because of

(a) shoot apical meristem
(b) position of axillary buds
(c) size of leaf lamina at the node below each internode
(d) intercalary meristem

Rajasthan PMT-2010

Ans. (d) : The length of different internodes in a culm of sugarcane is variable because of the intercalary meristem. These meristems are present involved in the increases of the internodal length.

54. Cork cambium and cambium are the example of :

(a) lateral meristem (b) primary meristem
(c) intercalary meristem (d) apical meristem

Rajasthan PMT-1998

Ans. (a) : Cork cambium and cambium are the example of lateral meristem. Vascular cambium is the type of cambium that is related to the conduction of water and nutrients. The cork cambium is the type of cambium that is related to the formation of the wood in the plants. The lateral meristem is responsible for the increase in the diameter of the plant or the secondary growth. It is of types like vascular cambium, interfascicular cambium, and cork cambium.
Thus, we can conclude that the vascular cambium and cork cambium are example of the lateral meristem.

55. The outermost primary meristem gives rise to:

(a) epidermis (b) procambium
(c) ground meristem (d) All of the above

UP CPMT-2001

Ans. (a) : The outermost primary meristem give rise to 'epidermis'. The outer most layer of cells is the protoderm which forms a single sheet of meristematic cells that give rise to the epidermis. The protoderm gives rise to epidermal tissue system, ground meristem forms cortex or ground tissue system and procambium forms vascular tissue system.

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56. The stem of grasses and related plants elongate by the activity of :
(a) Lateral meristem
(b) Apical Meristem
(c) Both apical and intercalary meristem
(d) Intercalary meristem

Karnataka CET-2003

Ans. (c) : The stem of grasses and related plants elongate by the activity of both apical and intercalary meristem. Both apical and intercalary meristems are referred to as primary meristems since they develop early in a plant's life and contribute to the building of the main plant body. Apical meristem is a primary meristem. It can also be referred to as the growing tips of the plant. An intercalary meristem is present at the end of plant. The intercalary meristem along with the apical meristem is responsible for the growth of the plant along its length.

57. The tissue of highest respiratory activity is
(a) Meristem (b) Ground tissue
(c) Phloem (d) Mechanical tissue

CG PMT-2007

Ans. (a) : The tissue with highest respiratory activity is 'Meristem'. The respiration rate is higher always in younger and actively growing meristematic tissues in comparison with the mature and older parts of the plant. Meristems are actively dividing tissues in a plant body. Also high respiration rate in these tissues provides important intermediates for biosynthesis of macromolecules.
Hence, Meristems has highest respiratory rate.

58. Inter fascicular cambium is found:
(a) between pith and vascular bundle
(b) between two vascular bundles
(c) In the vascular bundle
(d) Outside the bundle

Haryana PMT-2005

Ans. (b) : Inter fascicular cambium is found between the two vascular bundles. The cells present between the primary xylem and primary phloem are called interafascicular cambium. The meristematic tissue which develops between the two vascular bundles is called interfascicular cambium. It is responsible for the formation of secondary meristems.

59. Intercalary meristem results in
(a) secondary growth
(b) primary growth
(c) apical growth
(d) secondary thickening

Haryana PMT-2007

Ans. (b) : Intercalary meristem results in primary growth. This meristems are found at the bases of young leaves and internodes. They are involved in the primary growth of the plants as they continuously divide which causes the elongation of the plant stems or leaves. Primary growths are controlled by the root apical meristems or shoot apical meristems while secondary growth is controlled by the lateral meristems, called the vascular cambium and the cork cambium.

60. The tunica-corpus theory was proposed by
(a) Hofmeister (b) Nageli
(c) Strasburger (d) Schmidt

CG PMT-2009, 2006
Rajasthan PMT-2001
Haryana PMT-2009

Ans. (d) : The tunica – corpus theory was proposed by 'schmidt'. This theory is relevant only to shoot apex. According to this theory, the apical region of the shoot consist of two zones: tunica – It is the outer enveloping layer, made up of small cells that give rise to the epidermis and outer cortex. Corpus – It is the mass of cell forming the inner core. It produces the inner cortex, procambium and pith.

61. An auxotroph is:
(a) a plant that responds by bending towards sun
(b) an organism that depends on another organism for meeting its nutritional requirements
(c) a mutant which has lost its ability to synthesize one or more essential compounds
(d) a plant that is able to synthesize its own carbohydrate.

Haryana PMT-2004

Ans. (c) : An auxotroph is a microorganism that is unable to synthesize one or more essential growth factors, and it will not grow in fermentation media lacking them. It is a mutant which has lost its ability to synthesize one or more essential compounds.

62. Which is true for meristematic tissue?
(a) Their cells have dense cytoplasm and prominent nuclei
(b) Their cells are dead with large intercellular spaces
(c) These are usually modified for storage
(d) Their cells are most primitive, living and without nuclei

Haryana PMT-2004
Manipal-2003

Ans. (a) : Meristem growth in plants is largely restricted to specialised regions of active cell division called meristem. Meristematic cells have a prominent nucleus and a dense cytoplasm but it lack of a vacuole. This is so because meristematic cells have an ability to divide and form new cell. It have thin cellulose wall, no vacuole, dense cytoplasm, prominent nuclei.

63. Interfascicular cambium is
(a) apical meristem (b) secondary meristem
(c) primary meristem (d) abnormal meristem

Manipal-2013

Ans. (b) : Interfascicular cambium is a 'Secondary meristems. It along with the interfascicular cambium present between primary xylem and primary phloem forms a continuous rings of vascular cambium. It develops from the parenchymatous cells of medullary rays. Interfascicular cambium originates from parenchymatous cell through differentiation of the fascicular cambium.

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64. Fascicular, interfascicular and extra stelar cambium together constitute
(a) lateral meristems
(b) apical meristems
(c) intercalary merisetems
(d) ground meristemes.

AMU-1997

Ans. (a) : Fascicular, interfascicular and extra stelar cambium together constitute with 'lateral meristem'. Fascicular cambium, inter-fascicular cambium and extra-stelar (cork cambium) are examples of the secondary meristem. They are found in the mature regions of roots and shoots. They responsible for lateral growth of plants.

65. Lateral meristem is responsible for which of the following
(a) Growth in length
(b) Growth in thickness
(c) Growth in parenchyma
(d) Growth in cortex

CG PMT-2006

Ans. (b) : Lateral meristem is responsible for the growth in thickness of the plants. It is located in the stems and roots on the lateral side. Lateral meristem are referred to as the vascular cambium and cork cambium. It is also called a secondary meristem. Meristems are responsible for wound healing because they regenerate from other cells in wounded tissue.

66. Plant length is increased by
(a) Apical meristem (b) Lateral meristem
(c) Dermatogen (d) Periblem

MGIMS Wardha-2009
Haryana PMT-2009
CG PMT-2009

Ans. (a) : Plant length is increased by 'Apical meristem'. Apical meristematic tissue is a meristematic tissue located at the top of the root, stem and their branches, causing the growth of the plants organs in length. Apical meristem give rise to the primary plant body and are responsible for the extension of the root and shoots.
Hence, Apical meristem is responsible for increase in length of the plant.

67. Examples for lateral meristems are
(a) phellogen and procambium
(b) fascicular cambium and procambium
(c) procambium and dermatogen
(d) fascicular cambium and cork cambium

JCECE-2012
Manipal-2009

Ans. (d) : Examples of lateral meristems are 'fascicular cambium and cork cambium'. It is present along the longitudinal axis of stem and root. They help in increasing the thickness or girth of the stem and root. The vascular cambium (Fascicular) and cork cambium are examples of lateral meristem. These are the responsible for producing the secondary tissues.

68. Grass stem elongates after initial growth due to:
(a) lateral meristem
(b) secondary meristem
(c) intercalary meristem
(d) apical meristem

Uttarakhand PMT-2010
AP EAMCET-2002
AMU-1996

Ans. (c) : Grass stem elongates after initial growth due to 'intercalary meristem'. Meristem which occurs in between the mature tissues is called intercalary meristems present in grasses to replace the lost cells in the stem and elongate the stem. It is the meristem present at the base of the internodes of stem or leaf. It is found only in monocots.

69. Fusiform initial forms
(a) vascular rays (b) ray parenchyma
(c) tracheary elements (d) primary phloem

Haryana PMT-2008

Ans. (c) : Fusiform initial forms tracheary elements. Tracheary elements help in the conduction of water and responsible for distribution of raw sap throughout the plant body.

70. Meristem consists of:
(a) undivided cells
(b) cells in continuous state of cells division
(c) dead cells
(d) cells which divide rarely

Haryana PMT-2003

Ans. (b) : Meristem consist of cells in continuous state of cells division. It have a great potential for division. Meristems generally divided continuously and form a cluster of cells that further undergoes maturation to produce specialized cells. Meristematic tissues are responsible for plant growth these tissues constantly divide to produce new cells.

71. Vertically elongated cells in the lateral meristem producing axial system in the secondary xylem and phloem are known as
I. Fusiform initials
II. Combium cells
III. Phellogen cells
(a) Only I (b) I and II
(c) II and III (d) I, II and III

VMMC-2015

Ans. (a) : Vertically elongated cells in the lateral meristem producing axial system in the secondary xylem and phloem are known as 'fusiform initials'. They are elongated cells, which results in the production of cells that form the vertical system of secondary phloem and xylem, tracheary elements, sieve cells, fibres and the associated companion cells. Fusiform initials cell give rise to secondary xylem and phloem.

72. The secondary meristem initiates
(a) Basal growth (b) Transverse growth
(c) Radial growth (d) Vertical growth

J&K CET-2007

Ans. (c) : The secondary meristem initiates the 'radial growth'. Secondary meristem are responsible for the radial or secondary growth of plants. They also increases the thickness of plant body. Radial growth is a secondary growth which increases the girth or radius of a plant.

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73. Quiescent centre is found in root apex and acts as

(a) permanent source of active initiates
(b) reservoir of resistant cells
(c) reservoir of passive cells to form new root apex if root apex is damaged/killed
(d) All of the above

BVP-2012

Ans. (d) : Quiescent centre is found in root apex and acts as permanent source of active initiates. It acts as a reservoir of cells which constitute a permanent sources of active initials. Cells of inactive region of quiescent centre become active when the previously active gets damaged.

74. Primary growth is caused by :

(a) apical meristem (b) lateral meristem
(c) dermatogen (d) plerome

BCECE-2002

Ans. (a) : Primary growth is caused by apical meristem. This growth is initiated by the apical meristem and it helps the plant to grow upward. Apical meristem is present at the growing tips of roots and shoots and produce primay tissues.

75. Vascular cambium never develops in the stem of

(a) banana (b) guava
(c) mango (d) sunflower

AMU-2001

Ans. (a) : Vascular cambium never develops in the stem of banana'. Banana is a monocotyledonous plant. It has a single cotyledon present in the seed. The vascular cambium is absent in monocots (banana). Monocots never shows secondary growth.

76. Intercalary meristem is a derivative of

(a) Primary meristem (b) Secondary meristem
(c) Lateral meristem (d) Promeristem

Karnataka CET-2008

Ans. (a) : Intercalary meristem is a derivative of primary meristem. Intercalary meristems are present in grasses and regenerate parts removed by the grazing herbivores. The intercalary meristem helps in increasing the length of the internode. It is usually seen in monocot plants.

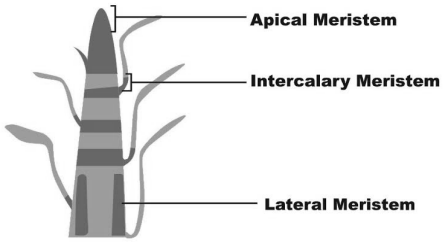
77. Which one of the following is not a lateral meristem ?

(a) Vascular cambium
(b) Interfascicular cambium
(c) Phellogen
(d) Intercalary meristem

AIPMT (Screening)-2010

Ans. (d) : Fascicular vascular cambium, interfascicular cambium and cork-cambium (phellogen) are examples of secondary or lateral meristem. These are responsible for producing the secondary tissues.

Apical and intercalary meristems are primary meristems. They are located at the base of internodes and promotes lengthening of stem and increase height of plant.



Vascular cambium- when the cells of cambium present between two vascular bundles.
Intrafascicular cambium- when the cells of cambium present between primary xylem and primary phloem.
Phellogen- Phellogen is a couple of layers thick.

78. If the apical bud has been removed then we observe:

(a) More lateral branches
(b) More axillary buds
(c) Plant growth stops
(d) Flowering stops

AIPMT-2000

Ans. (a) : When the apical bud is removed from the plant, the auxin hormone gets automatically removed and due to which the lateral buds grow very fast.

Apical dominance is the phenomenon which presence of apical bud does not allow the nearby lateral buds to grow.

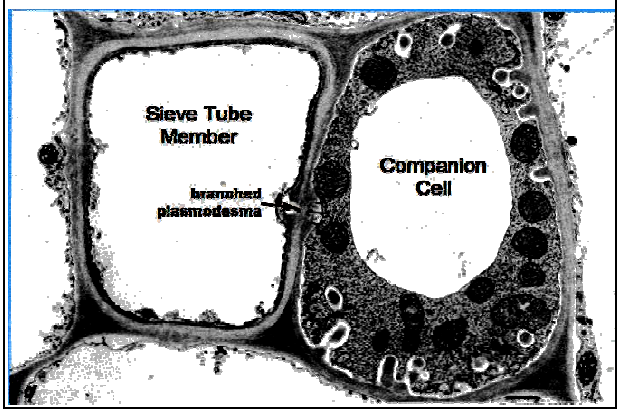
• Gibberellin is the hormone that breaks seed/bud dormancy. The tubers of potato reproduce vegetatively to give rise to new plants. So the dormancy of these tubers can be overcome by applying gibberellins.

79. Function of companion cells is

(a) Loading of sucrose into sieve elements
(b) Providing energy to sieve elements for active transport
(c) Providing water to phloem
(d) Loading of sucrose into sieve elements by passive transport

AIPMT (Mains)-2011

Ans. (a) : Function of companion cell is to load sugar and amino acids into sieve elements. These cells use transmembrane proteins to take up these molecules by active transport. The companium cells help in maintaining the pressure gradient in the sieve tubes.



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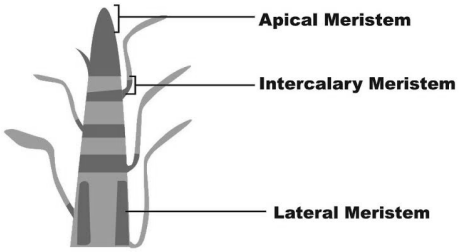
80. Meristematic tissue responsible for increase in girth of tree trunk is
(a) Apical meristem
(b) Intercalary meristem
(c) Lateral meristem
(d) Phellogen

NEET (Karnataka)-2013

Ans. (c) : Lateral meristem are the meristematic cells which are present along the lateral sides of stem and roots. They divide only in radial direction. Fascicular vascular cambium, inter-fascicular cambium and cork cambium (Phellogen) are example of this type of meristem. The meristems are responsible for increase in girth of stem and root.



81. In land plants, the guard cells differ from other epidermal cells in having :
(a) Chloroplasts
(b) Cytoskeleton
(c) Mitochondria
(d) Endoplasmic reticulum

AIPMT (Screening)-2011

Ans. (a) : The guard cells differ from other epidermal cells because guard cells contain chloroplast, whereas epidermal cells usually do not present. So they can manufacture food by photosynthesis

- The shape of guard cells are bean shaped in surface view, while the epidermal cells are irregular in shaped.

82. An important step in the manufacture of pulp for paper industry from the woody tissues of plants is the –
(a) Removal of water from the wood by prolonged heating at approximately 50º
(b) Treatment of wood with chemicals that break down cellulose
(c) Removal of oils present in the wood by treatment with suitable chemicals
(d) Preparation of pure cellulose by removing lignin

AIPMT-2005

Ans. (d) : An important step in the manufacturing of pulp for paper industry form the woody tissue of plants is the preparation of pure cellulose by removing lignin.

- Wood mainly consist by secondary xylem (sclerenchymatous cell) lignin. These cells provide strength to wood tissues. Preparation of pure cellulose for manufacture of pulp for paper industry from woody tissues of plants required removal of lignin from these woods.

83. Vascular cambium of stem is:
(a) partly primary and partly secondary meristem
(b) primary meristem
(c) secondary meristem
(d) intercalary meristem

J&K CET-2004

Ans. (a) : Vascular cambium divides the xylem to inner side phloem to outer side. It is also known as fascicular cambium. eg. secondary meristem.

C. Permanent (Simple and Complex) Tissue

84. P-proteins are associated with
(a) sieve tube elements
(b) xylem parenchyma
(c) trichomes
(d) tracheids and vessels

UP CPMT-2009
Punjab MET-2009
Rajasthan PMT-2009
MGIMS Wardha-2005

Ans. (a) : P– proteins are associated with sieve tube elements'. It is also known as phloem protein. P–protein aggregates at the sieve plate when the sieve element is disrupted, preventing the passage of phloem exudates the function of P-protein is sealing mechanism on wounding along with calluse and it is also related with conduction of food.

85. Which of the following is true?
(a) Vessels are unicellular and with narrow lumen
(b) Vessels are multicellular and with wide lumen
(c) Tracheids are unicellular and with wide lumen
(d) Tracheids are multicellular and with narrow lumen

AIIMS-2015
DUMET-2009
Rajasthan PMT-2007
AIPMT-2002

Ans. (b) : Tracheids are narrow lumen and unicellular, while vessels are wide lumen and multicellular.

Tracheids	Vessels
• It is a part of xylem, elongated narrow tube-like dead and empty cells with hard thick and lignified walls with large cell cavity. It is found alone in the wood of ferns like gymnosperm such as pines.	It is cylindrical tubular structure, formed of a row of cells placed end to end. • Vessels are only found in only Angiosperms such as mango tree.

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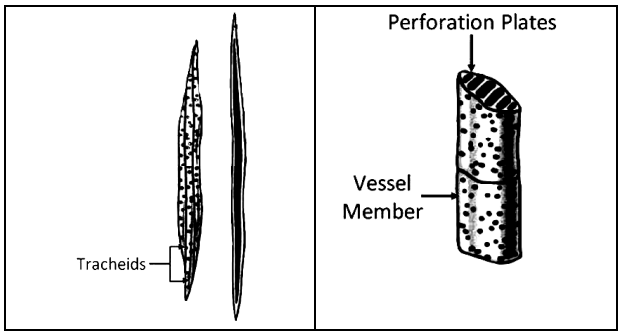

86. Complex tissue includes:

(a) collenchymas (b) apical meristems
(c) conducting tissue (d) idioblast

HP CET-2011
BCECE-2006
VMMC-2005
AMU-2004

Ans. (c) : Complex tissue includes 'conducting tissue'. The complex tissues are made of more than one type of cells and these work together as a unit. Xylem and phloem constitute the complex tissues in plants.
Xylem functions as a conducting tissue for water and minerals from roots to the stem and leaves.

87. Which of the following tissues consist of living cells?

(a) Vessels (b) Tracheids
(c) Companion cell (d) Sclerenchyma

Uttarakhand PMT-2009
BVP-2009
VMMC-2009
BHU PMT (Screening)-2009

Ans. (c) : Companion cells consists of living cell. The companion cells are specialized parenchymatous cells in the phloem tissues of the angiosperm. They are nucleated living cells with several ribosomes, plastids and mitochondria, phloem parenchyma and companion cells are element of phloem and both living cells.

88. Which combination of tissues acts together to provide the support to the hypocotyl of a seedling?

(a) Epidermis and collenchyma
(b) Xylem and parenchyma
(c) Epidermis and parenchyma
(d) Xylem and phloem fibres

HP CET-2011
VMMC-2005
AMU-2004
BVP-2003

Ans. (a) : Epidermis and collenchyma tissues acts together to provide the support to the hypocotyls of a seedling. The hypocotyl is the part of a plants embryo or seedling that lies between the radical and the cotyledons. The mechanical strength in hypocotyls of seedling is provided by epidermis and collenchyma tissues.

89. Xylem development is poor in

(a) Xerophytes (b) Halophytes
(c) Hydrophytes (d) Mesophytes

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : Hydrophytes are the plants that are submerged in water. These plants have poorly developed xylem because the whole plant body absorbs water and nutrients from the external aquatic environment by and thus, they do not require well-developed water-conducting tissues

90. Statement 1 : Well aerating tissue aerenchyma is the most important anatomical feature of all hydrophytes.
Statement 2 : Hydrophytes live in well aerated environment

(a) Statement 1 is true, statement 2 is false.
(b) Statement 1 and statement 2 are true.
(c) Statement 1 and statement 2 are false.
(d) Statement 1 is false, statement 2 is true.

AP EAMCET-12.07.2022 Shift-II

Ans. (a) : Aerenchyma is majorly found in aquatic and wetland plants. Aerenchyma is a modified parenchyma where the cells are arranged with regular air chambers in between to facilitate diffusion of gases in and out.
Aerenchyma helps in buoyancy and respiration. It is characteristically found in aquatic floating plants. It is located in stems, hypocotyls, taproots, adventitious roots and root nodules under flooded conditions.

91. Select the correct combination?

(i) Fruit wall of nuts
(ii) Pulp of fruit like guava and pear
(iii) Seed coat of legumes
(iv) Micropyle of pea

(a) All except (i) (b) All except (ii)
(c) All except (iii) (d) All except (iv)

AP EAMCET-03.09.2021 Shift-I

Ans. (d) : Sclerids are spherical, oval, highly thickened dead cells, with very narrow cavities.

Sclereids are found in fruit wall of nuts, the pulp of fruits like guava, pear, and sapota and seed coats of legumes.

92. Which of the following statement is correct?

(a) The collenchyma occurs in layers below the epidermis in monocotyledonous plants
(b) Sclerenchyma cells are usually dead and without protoplasts
(c) Xylem parenchyma cells are living and thin walled and their cell walls are made up of lignin
(d) The companion cells are specialized sclerenchymatous cells

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : The collenchyma occurs in layers below the epidermis in dicotyledonous plants and is absent in monocot plants.

- Sclerenchyma cells are usually dead. They become dead and lose their protoplasm after attaining maturity.
- Xylem parenchyma cells are living and thin walled and their cell walls are made up of cellulose and pectin.
- The companion cells are specialised parenchymatous cells.

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93. Phloem parenchyma is absent in ————

(a) Dicot stem
(b) Dicot leaf
(c) Monocot stem
(d) Dicot root

AP EAMCET-03.09.2021 Shift-I

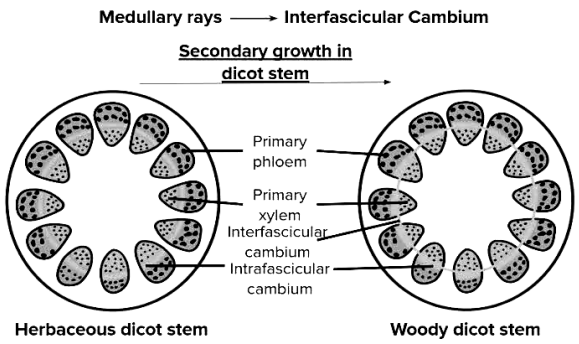
Ans. (c) : Phloem parenchyma is a part of phloem complex tissue. It is living and parenchymatous cells. It perform the function of transporting of organic food in plant. It is absent in the plant where no secondary growth occurs. So, it is absent in monocot stem because in monocot stem no secondary growth occur.

94. Select the correct pair.

(a)	**Loose parenchyma cells rupturing the epidermis and forming a lens shaped opening in bark**	**-**	**Spongy parenchyma**
(b)	**Large colorless empty cells in the epidermis of grass leaves**	**-**	**Subsidiary cells**
(c)	**In dicot leaves, vascular bundles are surrounded by large thick-walled cells**	**-**	**Conjunctive tissue**
(d)	**Cells of medullary rays that form part of cambial ring**	**-**	**Interfascicular cambium**

NEET-2021

Ans. (d) : When the cells of medullary rays differentiated. They give rise to the new cambium called **interfascicular cambium.**



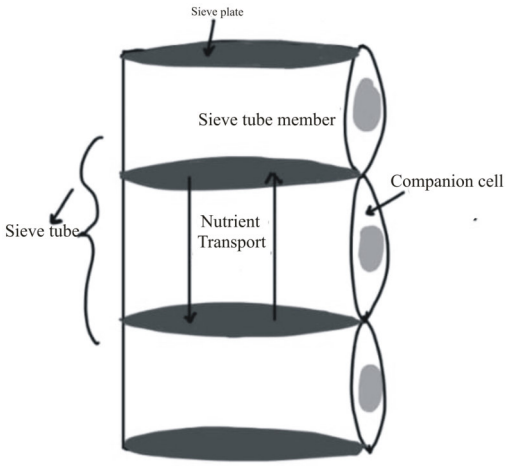
- Complementary cells are loose parenchyma cells rupturing the epidermis and forming a lens shaped opening in bark.
- Large colorless empty cells in the epidermis of grass leaves are called **bulliform cells.**
- In dicot leaves vascular bundles are surrounded by large thick walled cells called **sheath cells**.

95. Which of the following is an incorrect statement?

(a) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm
(b) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles
(c) Microbodies are present both in plant and animal cells
(d) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm

NEET-2021

Ans. (b) : Mature sieve tube elements do not have nucleus but have cytoplasm. (Anucleated living cells).



96. Which of the following plant tissue cannot be used as explant in tissue culture?

(a) Meristem (b) Parenchyma
(c) Sclerenchyma (d) Collenchyma

Karnataka CET-2020

Ans. (c) : Sclerenchyma tissues cannot be used as explants in tissue culture because sclerenchymatous tissue have lignified sencondary wall and dead in nature. Meristem, parenchyma and collenchymas are living cells.

97. Which is the living mechanical tissue in plants?

(a) Parenchyma (b) Sclerenchyma
(c) Collenchyma (d) Xylem

TS EAMCET-28.09.2020 Shift-I

Ans. (c) : Collenchyma is the living mechanical tissue in plants.

- parenchyma consist of living cell but they help in storage.
- Sclerenchymatous cell provide mechanical support but they are dead cell.

98. Pectinisation is seen in

(a) Parenchyma (b) Collenchyma
(c) Sclerenchyma (d) Chlorenchyma

AP EAMCET-24.09.2020 Shift-II

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Ans. (b) : Collenchyma tissue is composed by elongated living cells of uneven primary thick walls, which posses hemicellulose, cellulose and pectic materials.

- It provides support, structure, mechanical strength, and flexibility to the petiole, leaf veins and stem of young plants, allowing for easy bending without breakage.
- Parenchyma is a simple living tissue and the cell wall is made up of cellulose.
- Sclerenchyma is a simple dead tissue. The cell wall is made up of cellulose and lignin.

99. Match the following

(i)	**Chlorenchyma**	**(p)**	**Nymphaea**
(ii)	**Aerenchyma**	**(q)**	**Canna**
(iii)	**Storage Parenchyma**	**(r)**	**All green parts**
(iv)	**Stellate parenchyma**	**(s)**	**Potato**

(i) (ii) (iii) (iv)
(a) s, p, q, r
(b) p, q, r, s
(c) s, r, q, p
(d) r, p, s, q

SRM JEEE-2019

Ans. (d) :
(i) Chlorenchyma — All green parts
(ii) Aerenchyma — Nymphaea
(iii) Storage parenchyma — Potato
(iv) Stellate parenchyma — Canna

100. The tissue generally present in all organs of plant is_____
(a) Parenchyma (b) Chlorenchyma
(c) Collenchyma (d) Sclerenchyma

SRM JEEE-2019

Ans. (a) : The tissue generally present in all organs of plant is parenchyma. It is a type of simple permanent tissue that makes a major part of ground tissues in plants, where other tissues like vascular tissues are embedded. They are non-vascular and composed of simple, living and undifferentiated cells, which are modified to perform various functions.

They are of two types — (i) Phloem parenchyma
(ii) Xylem parenchyma.

101. Match the following

(A) **(i) Sclereid**

(B) **(ii) Tracheid**

(C) **(iii) Fibre**

(D) **(iv) Vessel**

(v) Colenchyma

The correct answer is

	A	B	C	D
(a)	(ii)	(i)	(iii)	(iv)
(b)	(iii)	(i)	(ii)	(iv)
(c)	(ii)	(iv)	(i)	(iii)
(d)	(v)	(ii)	(iv)	(iii)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) :
(A) → Fibre
(B) → Sclereid
(C) → Tracheid
(D) → Vessel

- Sclereids are a fundamental cell type that widely exist in higher plants and are generally thought to have a mechanical function.
- A tracheid is a long and tapered lignified cell in the xylem of vascular plants.
- A vessel is a very large central cavity element or vessel member (also called xylem vessel) is one of the cell types found in xylem which is water conducting tissue of plants.

102. Pick the incorrect statement with respect to xylem parenchyma
(a) The cell wall is thin and made up of cellulose
(b) The cells store food reserves
(c) The cells assist in conduction of water
(d) The cells are dead at maturity

SRM JEEE -2017

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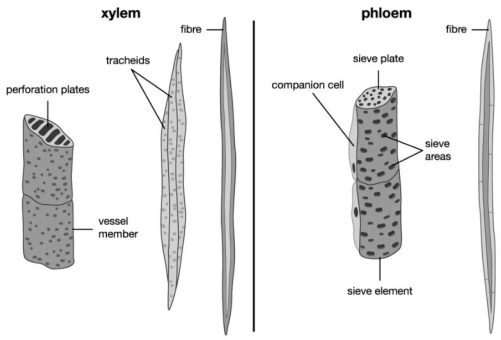
Ans. (d) : Xylem is a complex tissue. It consists of vessels, tracheids, xylem fibres and xylem parenchyma. Except for xylem parenchyma, all other components of xylem tissue are dead. Xylem parenchyma contains parenchymatous cell having a fully functional nucleus and are capable of performing various life processes.

103. Vessels are found in : -

(a) All angiosperms and some gymnosperm
(b) Most of the angiosperm and few gymnosperms
(c) All angiosperms, all gymnosperms and some pteridophyta
(d) All pteridophyta

AIPMT-2002

Ans. (a) : Vessels are the characteristic feature of angiosperm.
Vessels are absent in gymnosperm except Gnetales member.



104. The movement of water and minerals in xylem and the movement of phloem sap in phloem is respectively.

(a) Unidirectional, bidirectional
(b) Bidirectional, bidirectional
(c) Bidirectional, unidirectional
(d) Unidirectional, unidirectional

GUJCET-2016

Ans. (a) : The movement of water and minerals in xylem is always unidirectional i.e. upwards while movement of phloem sap in phloem is bidirectional i.e. upward and down wards because source-sink relationship variable.

105. Nucleus is absent in which of the following?

(a) Xylem parenchyma
(b) Phloem parenchyma
(c) Sieve tube cells
(d) Companion cells

Assam CEE-2014

Ans. (c) : Sieve tube is an elongated living cell of the phloem which is responsible for the transportation of food (mostly sugar). At maturity, the nucleus of the sieve tube gets fragmented and disappears along with the cellular organelles.

106. The main function of phloem is translocation of:

(a) food (b) water
(c) mineral (d) air

BHU PMT (Mains)-2010

Ans. (a) : Phloem is responsible for the transport of food from the leaves to all the parts of the plant. Phloem tissue transports and distributes the sucrose and nutrients produced by plants during photosynthesis. Phloem is in charge of transporting food and nutrients from the leaves to all the plant's part

107. Who proposed the Cohesion theory of ascent of sap?

(a) Strasburger (b) Godlewski
(c) Western (d) Dixon and Jolley

BVP-2003

Ans. (d) : Dixon and Jolley was proposed the cohesion theory of ascent of sap. The flow of water and dissolved mineral salts called ascent of sap. According to cohesion theory ascent of sap is due to the transportation pull or tension, water cohesion and hydration of cell walls.
Negative pressure or tension due to transpiration is conveyed to the root by a constant column of water within the xylem. Breaking the water column is avoided by cohesion between neighboring water molecules and adhesion between water molecules and cell walls.

108. Which tissue is involved in conduction of water:

(a) Xylem (b) Phloem
(c) both a and b (d) Parenchyma

BVP-2001

Ans. (a) : Xylem is one of the complex permanent tissue present in plants. It is composed of xylem parenchyma, vessels, tracheids, and xylem fibers. They help in the conduction of water in the plant. Xylem is called water-conducting tissue because, it is mainly involved in the conduction of water from roots to the aerial parts of the plant. It also helps in compensating for the loss of water due to transpiration and photosynthesis. Because of its major involvement in the transportation of water, it is known as a water-conducting tissue.

109. As tree grow older, which of the following will increase more rapidly in thickness?

(a) Heart wood (b) Sap wood
(c) Xylem (d) Phloem

BVP-2001

Ans. (a) : In old trees, the grater part or secondary xylem is dark brown due to deposition of organic compounds like tannins, resins, oils, gums, aromatic substance and essential oils in the central or innermost layers of the stem. These substance make it hard, durable and resistant to the attacks of micro-organism and insects. This region comprises dead elements with highly lignified walls and is called heart wood. Heartwood is also known as duramen.

110. Leptome is used for:

(a) Phloem (b) Xylem
(c) Fibres (d) Parenchyma

BHU PMT (Mains)-2006

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Ans. (a) : Phloem is also known as leptome. Main function of phloem is transport of food material, organic materials and amino acids.

- Xylem is a transport tissue in vascular plants that transports water from roots to stems, leaves and other part of plant.
- The fibres are thick-walled, elongated and pointed cells, generally occurring in groups, in various parts of the plant.
- Parenchyma is the functional tissues in plants and animals. In plants, they refer to a specific type of ground tissue having thin cell walls and the ability to grow and divide. They make up most of the cells within leaves, flowers, and fruits.

111. Read the following statements A and B.

A: Many organs of aquatic plants float in water.

B: Large air gaps are present in the collenchymas tissues of lotus leaf.

Select the correct answer.

(a) Statement A is correct and B is wrong.
(b) Statement B is correct and A is wrong.
(c) Statements A and B both are correct.
(d) Statements A and B both are wrong.

Karnataka CET-2011

Ans. (a) : Many organs of aquatic plant float in water because of consists of network of parenchyma cell which enclose very large air cavities. These air cavities store gases and make the aquatic plant light and buoyant.

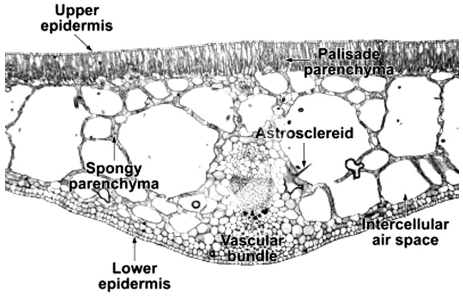
- As air gap are present in the collenchyma tissue of lotus leaf because collenchyma is a simple tissue with pectocellulose thickening in its wall.

112. The branched sclereids present in hydrophytes are:

(a) Osteosclereids (b) Trichosclereids
(c) Macrosclereids (d) Astrosclereids

AIIMS-2009

Ans. (d) : Astrosclerids are star shaped. It has branched i.e arm. Many hydrophytes like nymphaea, astrosclerids are found.



113. Collenchyma occurs in the stem and petioles of

(a) xerophytes (b) monocots
(c) dicot herbs (d) hybrophytes.

AIPMT-1990

Ans. (c) : Collenchyma occurs in the stem and petioles of dicot herbs. It is found either as a homogeneous or in patches. It consist of cell which are much thickened at the corners due to a deposition of cellulose, is found in epidermis of dicot stem and petioles and abundant in climbing stems.

114. Cork cambium and vascular cambium are

(a) parts of secondary xylem and phloem
(b) parts of pericycle
(c) lateral meristem
(d) apical meristem.

AIPMT-1990

Ans. (c) : Vascular cambium and cork cambium are the two lateral meristems. Lateral meristems are located in the stem and roots on the lateral side. It increases thickness of the plants.

115. Sieve tubes are suited for translocation of food because they possess

(a) bordered lumen and
(b) no end walls
(c) broader lumen and perforated cross walls
(d) no protoplasm.

AIPMT-1989

Ans. (c) : Sieve tube are suited for translocation of food because they possess broader lumen and perforated cross walls sieve tubes are elongated tubular conducting channels of phloem. The wall possess many small pores and have thin cellulosic wall.

116. Death of protoplasm is a pre-requisite for a vital function like.

(a) transport of sap (b) transport of food
(c) absorption of water (d) gaseous exchange

AIPMT-1989

Ans. (a) : Death of protoplasm is a pre-requisite for a vital function like transport of sap. Xylem is a dead tissue and do not have protoplasm, xylem perform the function of transport of water or sap inside the plant from roots to leaves. Certain cells get lignified deposition and leading to death of protoplasm such as xylem cell.

117. Bordered pits are found in

(a) sieve cells (b) vessel wall
(c) companion cells (d) sieve tube wall

AIPMT-1993

Ans. (b) : Borded pits are found in vessel wall.
Pits are the depressions or cavity formed in the cell wall that are found in the thick walled schlerenchyma, parenchyma cells and the tracheary elements, i.e. vessels and tracheids.

118. An organised and differentiated cellular structure having cytoplasm but no nucleus is

(a) vessels (b) xylem parenchyma
(c) sieve tubes (d) tracheids.

AIPMT-1991

(c) : An organized and differentiated cellular structure having cytoplasm but no nucleus is sieve tubes.
A mature sieve elements possesses a peripheral cytoplasm and large vacuole but lacks a nucleus. The functions of sieve tubes are controlled by the nucleus of companion cells.

119. Which of the following is not true about 'sclereids'?

(a) These are groups of living cells.
(b) These are found in nut shells, guava pulp, pear.

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(c) These are also celled stone cells.
(d) These are form of sclerenchyma with fibres.

AIPMT-1996

Ans. (a) : Sclereids are a type of sclerenchyma cells. They are spherical, oval or cylindrical highly thickened dead cells (non living) with very narrow cavities (lumen). These are commonly found in the fruit walls and nuts, pulp of fruits like guava, pear and sapota, seed coats of legumes and leaves of tea. Sclerenchyma provides mechanical supports to organs.

120. Removal of apical bud results in
(a) formation of new apical bud
(b) elongation of main special bud
(c) death of plant
(d) formation of lateral branching

AIPMT-1993

Ans. (d) : Removal of apical bud results in formation of lateral branching because the apical bud produces a hormone called Auxin which inhibits the growth of the lateral buds. Apical bud is removed resulting in the removal of apical dominance is broadly used in tea plantation.

121. Aerenchyma is found in :
(a) parenchyma (b) xylem
(c) phloem (d) sclerenchyma

Punjab MET-2006
CG PMT -2004

Ans. (a) : The most common type of simple permanent tissue present in all the plants which are isodiametric i.e., expanded equally and vary greatly in morphology along with physiology is known as parenchyma. In aquatic plants, large air cavities are present in parenchyma to give support to them to float on water. Such a parenchyma type is called as aerenchyma.

122. Stelar tissues like xylem and phloem, etc, arise from which of the following
(a) protpderm (b) cambium
(c) procambium (d) lateral meristem

BCECE-2015

Ans. (c) : Steler tissues like xylem and phloem, etc arise from procambium. The procambium is a meristematic tissue concerned with providing the primary tissue of the vascular system.

123. Which of the following cells is not totipotent?
(a) Pith cell (b) Epidermal cell
(c) Sieve cell (d) Pollen grain

JIPMER-2002

Ans. (c) : Sieve cell is not totipotent because sieve cell have a large central vacuole with thin peripheral protoplasm.

• Totipotent cell have the ability of regeneration.

• **Sieve cell** : - Sieve cells are long, conducting cells with narrow diameter that do with albuminous cells that helps in the transportation of organic materials. Sieves cells are single cells. The sieves pores are present on both lateral and walls.

124. Hard, lignified, thick walled, long and pointed cells in a plant are
(a) parenchyma (b) sclerenchyma
(c) collenchyma (d) sclereids

CG PMT-2005

Ans. (b) : Hard, lignified, thick walled, long and pointed cells in a plant are sclerenchyma. These cells are also specialised cells. The wall is made up of lignin which makes it waterproof cells are consists of rigid and thick cell walls. At maturity consists of dead cells.

125. Identify from the following a plant tissue in which lignin does not occur in the cellwalls
(a) Sclerenchyma fibers (b) Collenchyma
(c) Xylem tracheae (d) Sclereids

Karnataka CET-2005

Ans. (b) : Lignin does not occurs in the cell wall of collenchyma. Collenchyma cell are living cells and have cellulosic cell walls and helps the plant to keep their shape. Lignin, complex oxygen–containing organic polymer, with cellulose forms the chief constituent of wood. Lignin is second most abundant organic material on earth.

126. Tyloses are the structures found in xylem vessels:
(a) help in efficient flow of water
(b) help in efficient flow of nutrients
(c) function is neutral
(d) all the time hinders the flow of water

Karnataka CET-2000

Ans. (d) : Tyloses are the balloon like structure which are developed by the adjacent xylem parenchyma and ray parenchyma cells and block the lumen of vessels.

• Tyloses are commonly found in many angiospermic families normally they develop into heart wood to give extra mechanical support.

127. Aerenchyma is present in which of the following plants ? (1) Neptunia (2) potamogeton (3) Bryophyllum (4) Vallisneria
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (c) : Aerenchyma is present in potamogeton and vallisneria. Aerenchyma helps in buoyancy. It is well developed in hydrophytes. Aerenchyma is a modified parenchyma, tissue containing air chambers between cells.

These cells facilitate the diffusion of gasses between the plants and its surroundings and provide buoyancy to aquatic plants.

128. Latex vessels are found in (1) Calotropis (2) Hevea (3) Oleander (4) Papaya
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (c) : Latex vessels are found in Hevea and Papaya. In Hevea, latex vessels take place secondary phloem and papaya latex vessels take place in both secondary phloem and secondary xylem.

129. In the sieve elements, which one of the following is the most likely function of P-proteins?

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(a) Deposition of callose on sieve plates
(b) Providing energy for active translocation
(c) Autolytic enzymes
(d) Sealing off mechanism on wounding

JIPMER-2011

Ans. (d) : The balloon shaped intrusions appear in the xylem vessels of heart wood or duramen are called Tyloses. These are formed by the intrusions of ray parenchyma through pits present in the cell wall of vessels. In this cell walls are lignified. They block the xylem vessels. Due to the presence of tyloses, Pathogenic organisms cannot infect the heart wood due to the presence of tyloses. The main function of P-Protein is sealing mechanism on wounding.

130. Sieve tube is :
(a) without nucleus (b) multinucleate
(c) uninucleate (d) none of these

Rajasthan PMT-1999

Ans. (a) : Sieve tubes are considered living cells without a nucleus because the nucleus of companion cells controls their functional activities. Companion cells which unite with sieve tubes to form the sieve element-companion cell complex are related to sieve - tube members.

Note - The cell nucleus is a prominent structure that is responsible for undertaking several processes such as transcription and replication. The nucleus is considered as the controlling center of the cells . It's present mostly in all eukaryotic except a few. In plant cells , the nucleus is absent in the sieve tubes. Sieve tubes cells are conducting cells of the phloem and do not contain nucleus and ribosome.

131. The plant tissue having aquatic adaptation is
(a) collenchyma (b) sclerenchyma
(c) aerenchyma (d) parenchyma

UP CPMT-2012

Ans. (c) : The adaptations can be easily observed in the anatomy of the hydrophytes. Aerenchyma is specialized parenchyma cells which are air -filled. They provide buoyancy to the aquatic plants.

In the cross-section of aquatic plants aerenchyma appears like a cavity. Each cavity is separated from one another using chlorenchymatous cells.

Some characteristics of parenchyma are as follows.

The arenchyma is filled with respiratory gases like carbon dioxide, oxygen. The air chambers have the presence of cross septa called as the diaphragm which provides better aeration and is important in plant floating.

132. Collenchyma is
(a) living and contains protoplasm
(b) dead and hollow
(c) dead and filled with reserve food
(d) living and contains no reserve food

JCECE-2008

Ans. (a) : Collenchyma is living and contains protoplasm. It is a supporting tissue composed of more or less elongated living cells with unevenly thickened, nonlignified primary walls. collenchyma tissue are found below the epidermis of stem and around veins of leaves in plants.

133. The chief function of sieve tube element is:
(a) to conduct minerals
(b) to help the plant in forming wood
(c) to transport water from roots to leaves
(d) to translocate the organic material from source to sink

Manipal-2006

Ans. (d) : The chief function of sieve tube element is to translocate the organic material form source to sink. Material from source to sink sieve tubes are a component of the phloem in plants. They function as the vessel that transport organic food and other material across the plant. It transport of carbohydrates, primarily sucrose, in the plant.

134. Tyloses thickenings are seen in
(a) ray parenchyma and xylem cells
(b) sclerenchyma
(c) ray parenchyma only
(d) collenchyma

BHU PMT-2004
UP CPMT-2001
Punjab MET-1999

Ans. (a) : Tyloses thickenings are seen in ray parenchyma and xylem cells.' Tyloses are balloon – like swellings or projections that fill the vessels. Tyloses are spheroidal protoplasmic bulges that are generally formed when the adjacent parenchyma cells, axial parenchyma or raycells, protrude into the dead axial conducting cells.

135. Lignification is associated with:
(a) xylem (b) phloem
(c) parenchyma (d) chlorenchyma

Punjab MET-2006
Rajasthan PMT-2004

Ans. (a) : Lignification is associated with 'xylem' it is a cell wall fortifying process which occurs in xylem tissue in a scheduled manner during tissue differentiation. It is a complex process. It's main function is to strength in the plant vascular body.

136. Oval, spherical or polygonal cells, thickening at the corners due to the deposition of cellulose, hemicellulose and pectin, often containing chloroplasts and having or not having intercellular spaces are called
(a) parenchyma (b) chlorenchyma
(c) sclerenchyma (d) collenchyma

AMU-2015

Ans. (d) : Oval, spherical or polygonal cells, thickening at the corners due to the deposition of cellulose, hemicelluloses and pectin often containing chloroplasts and having or not having intercellular spaces are called 'Collenchymatous cells.

The cells of collenchymas tissue may also usually be oval, round or virtually usually polygonal and often type of basically comprise chloroplasts in a genuinely most important way in an especially huge way. It consists of cells which are much thickened at the corners due to the deposition of cellulose, pectin and the hemicellulose. Intercellular spaces are absent in collenchyma tissue.

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137. Vessels and companion cells are characteristics of :
(a) angiosperm (b) gymnosperm
(c) pteridophyta (d) fern

BCECE-2005

Ans. (a) : Vessels and companion cells are characteristics of 'angiosperm'. It is one of the important features of flowering plants and around the plant it carries water. Water transport is maintained by the xylem part of angiosperms and transport of food is maintained by the phloem part. Companion cells are the integral component of the phloem in the angiosperms. It is closely associated with the development and function of a sieve-tube element.
Hence, vessels and companion cells are the characteristic features of angiosperms and absent in gymnosperms, pteridophytes, and bryophytes.

138. Which of the following cell is enucleate at maturity?
(a) Sieve tube (b) Xylem
(c) Tracheids (d) Fibre

BHU PMT-2002
AIIMS-2000

Ans. (a) : 'Sieve tube' cell is enucleate at maturity. A matured sieve cell or sieve tube element lack of nucleus Thus, these are enucleated living cells.

139. Porous wood contains
(a) vessels (b) tracheids
(c) fibres (d) parenchyma

BVP-2010

Ans. (a) : Porous wood contains the 'vessels'. The wood produced by angiosperms is called hard wood. It is composed mainly of vessels and is also called 'porous wood.

140. Which of the following statements is correct?
(a) Xylem is made of all living cells
(b) Xylem is made of living and non-living cells
(c) Xylem is made of non-living cells
(d) Xylem does not contain cells

BVP-2010
BHU PMT(Mains)-2005

Ans. (b) : Xylem is made of living and nonliving cells. It is a plant tissue that is complex and it is responsible for water transport and nutrients to the plant Xylem–type vessel cells can be either alive or dead. According to botanists, the elements of xylem tissue are dead except for the living parenchyma.

141. Vessels and companion cells are absent in :
(a) gymnosperm and pteridophyta
(b) pteridophyta and monocot
(c) dicot and angiosperms
(d) none of the above

Rajasthan PMT-1996

Ans. (a) : Vessels and companion cells are absent in 'gymnosperm and pteridophyta'. Gymnosperms do not have vessels and companion cells. Xylem in gymnosperms consists of tracheids instead of vessels. Gymnosperms and lower plants such as Pteridophytes, mosses and ferns lack sieve tubes and companion cells. Pteridophytes are vascular plants but they differ from angiosperms in that they lack Xylem vessels and phloem companion cells. Gymnosperms cells for food conduction.

142. Which of the following tissue is complex?
(a) Sclereids (b) Xylem
(c) Collenchyma (d) Sclerenchyma

UP CPMT-2010

Ans. (b) : Xylem and phloem are known as complex tissues as they both are made up of more than one type of cells. These cells work in a coordinated manner, as a unit, to perform the various functions. Xylem helps in conducting of water and minerals. Xylem are composed of tracheids, xylem parenchyma, vessels and xylem fibres.

143. Which of the following is removed in girdling experiment?
(a) Bark only
(b) Bark with phloem
(c) Phloem only
(d) Completely vascular tissue

UP CPMT-2010

Ans. (b) : 'Bark with phloem' is removed in girdling experiment. This experiment is used to identify the tissue through which the food is transported. In this experiment bark (Phloem) is removed from the wood by a process known as girdling. When a ring of bark is removed from a woody plant, the woody xylem part remains intact, which causes the water and the nutrients to reach the leaves.

144. Phloem conducts food by
(a) perforated sieve plates
(b) bast fibres
(c) xylem parenchyma
(d) xylem fibres

UP CPMT-2003

Ans. (a) : Phloem conduct food by perforated sieve plates. Sieve plates are connecting and transport tissue in plant. Sieve plate allows the food to pass through the phloem tubes. The tiny pores present on these tubes help in the transport and absorption of food particles. These have long and elongated structures that connect the roots and all other parts of plants.

145. The nature of cell occurring in medulla is
(a) Suberised (b) Liquefied
(c) Collenchymatous (d) Parenchymatous

VMMC-2013

Ans. (d) : The nature of cell occurring in medulla is 'parenchymatous', It is made up of parenchymatous cells, medulla is a ground tissue present at the central region of stele. It consist of parenchymatous cells, medulla is also called Pith. Pith stores water and food materials.

146. The function of a vessel is
(a) conduction of food
(b) conduction of water and minerals
(c) conduction of hormones
(d) All of the above

Manipal-2012, 2000
Punjab MET-2004

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Ans. (b) : The function of vessel (present in xylem) is conduction of water and minerals. In plants, the same set of pipe–like vessels transport water, mineral salts and food. It is present only in angiosperms. Vessels are longitudinal channels composed of perforated cells.

147. Phloem contains (1) dead matter in it know as bast (2) long and narrow sclerenchymatous fibres (3) companion cell, which are living, thin-walled, narrow. (4) cells which are long and tubular with lignified cell wall

(a) 1,2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (d) : From the above Statement is (d) option a correct answer. Phloem contains dead matter in it which is known as bast. It contains companion cells, which are living, thin- walled, narrow. Phloem fibres also called as 'bast fibres' are the only dead cells present in the phloem. Phloem parenchyma and companion cells are elements of phloem and both are living cells and thin walled.
Hence, statement 1 and 3 are correct.

148. The inter xylary phloem is found in

(a) Salvia stem (b) Cucurbita stem
(c) Calotropis stem (d) None of the above

BHU PMT (Mains)-2011

Ans. (c) : The interxylary phloem is found in 'Calotropis stem'. Interxylary phloem is the presence of phloem strands embedded within the secondary xylem and produced by the activity of a single cambium, calotropis stem said to be interxylary due to its presence inside xylem.

149. The plant tissue having aquatic adaptation is

(a) collenchyma (b) sclerenchyma
(c) aerenchyma (d) parenchyma

UP CPMT-2012

Ans. (c) : The plant tissue having aquatic adaptation is 'aerenchyma'. Aerenchyma is a special spongy tissue with large intercellular air spaces that is found in aquatic plants. These air spaces are help in gaseous exchange. These are makes the plant light, hence, the plants can float very easily in water.

150. Which of the following maintains continuity between the water and lipid phases inside and outside the cells?

(a) Cell wall
(b) Lecithin
(c) Cell vacuole
(d) Cell membrane of woody plants

Uttarakhand PMT-2004

Ans. (b) : 'Lecithin' maintains continuity between the water and lipid phases inside and outside of the cells. The major phospholipids is made up of phosphotidyl-cholines, also called lecithin. It maintains the continuity between the water and lipid phases.

151. Damaged sieve tubes are sealed by deposition of

(a) Pectin (b) Callus
(c) Suberin (d) Lignin

BHU PMT (Screening)-2007

Ans. (b) : Damaged sieve tubes are sealed by deposition of 'callus'. Callus is formed by a carbohydrate called callose. When callus is formed the pores are blocked and so the transport of food material is retarded. At the advance of spring this substance dissolve and the pores open again. Callose is deposited into the tangled mass in the sieve pores of damaged sieve tubes, which serves to seal off the damaged sieve elements.

152. The jute fibres anatomically are

(a) Bast fibres (b) Cortical fibres
(c) Xylem fibres (d) Pith fibres

BHU PMT (Screening)-2007

Ans. (a) : The jute fibres anatomically are ' Bast fibres', It is a ligno-cellulosic fibre that is partially a textile fiber and partially wood. It falls in to the bast fibre category. This fibre is collected from bats or skin of the plant. It is also known as golden fibre mainly because of its colour.

153. In the sieve elements, which one of the following is the most likely function of P-proteins?

(a) Deposition of callose on sieve plates
(b) Providing energy for active translocation
(c) Autolyric enzymes
(d) Sealing off mechanism on wounding

Rajasthan PMT-2010

Ans. (d) : In the sieve elements, sealing off mechanism on wounding is the most likely function of P-proteins. P-protein is also called phloem protein. This protein can be traced to the phloem. The most important function of P-protein is the sealing mechanism on wounding P-proteins are usually found in phloem of dicot plants.

154. Wilting of plant is due to

(a) blockage of phloem
(b) blockage of xylem
(c) when some roots and phloem are removed
(d) tracheid is blocked

BCECE-2010
WB JEE-2007

@apna_pdf

Ans. (b) : Wilting of plant is due to the 'blockage of xylem'. The collapse of leaves due to loss of water is called 'wilting'. It may be caused due to excessive transpiration, blocking of xylem elements or some diseases, when roots are unable to supply sufficient moisture to the stems and leaves plants to wilt.

155. When sunflower leaf is exposed to sunlight, the solar radiations first pass through its upper epidermis and then through

(a) spongy parenchyma
(b) lower epidermis
(c) vascular bundles
(d) palisade parenchyma

AMU-2011

Ans. (d) : When sunflower leaf is exposed to sunlight, the solar radiations first pass through its upper epidermis and then through palisade parenchyma. In a dicot leaf-symmetry is dorsiventral, stomata are more on lower surface, bundle sheath is made up of parenchyma, they have the palisade parenchyma on adaxial side and spongy parenchyma on abaxial side, sunflower is a dicot.

156. One of the following is not true for hydrophytes.

(a) Vessels are usually absent
(b) Tracheids are absent
(c) Cuticle is poorly developed
(d) Air chambers are well developed

AMU-2010

Ans. (b) : Tracheids are absent is not true for the hydrophytes. In hydrophytes cuticle is poorly developed. It have special air chambers called 'aerenchyma'. Tracheids are developed but the vessels are completely absent in hydrophytes.

157. Medullary rays are made up of

(a) parenchymatous cells
(b) sclerenchymatous cells
(c) tracheids
(d) fibres

AMU-2010

Ans. (a) : Medullary rays are made up of 'parenchymatous cell. Medullary rays are also known as vascular rays or pith rays. These rays are parenchymatous cells which allow the radial transport of sap and essential in the process of tylosis. Medullary rays store and transport food material.

158. Growth rings are formed due to activity of :

(a) extrastelar cambium (b) intrastelar cambium
(c) interstelar cambium (d) both 'a' and 'c'

MGIMS Wardha-2004

Ans. (b) : Growth rings are formed due to the activity of intrastelar cambium. These rings are found in trees. The growth occurs in the cambium which creates new tissue and increases the growth of the tree. Cambium is responsible for the annual or growth ring. Intrastelar cambium is present between xylem and phloem in dicot stem and roots. The vascular cambium is present within the stele, therefore it is also termed as intra-stellar cambium (vascular cambium) is responsible for increasing the diameter of stems and roots and for producing woody tissue.

159. Cotton fibres which are obtained from Gossypium are:

(a) surface fibre (b) soft fibre
(c) hard fibre (d) bast fibre

VMMC-2006

Ans. (a) : Cotton fibres are surface fibre which are obtained from Gossypium, extracted from the covering of seed. They grow from the surface of seeds, leaves or fruits. The surface fibre is made of pure cellulose.

160. The layer of parenchyma surrounding a vascular bundle is known as:

(a) bundle sheath
(b) bundle shield
(c) bundle parenchyma
(d) bundle fibre

VMMC-2006

Ans. (a) : The layer of parenchyma surrounding a vascular bundle is known as ' bundle sheath'. The bundle sheath cells are a layer of cells found in plant leaves and stem. These cells form a sheath around the vascular bundles. These are consist of chloroplasts and are key sites of the Calvin cycle. In dicots the bundle sheath parenchyma also called border parenchyma.

161. Collenchyma differs from sclerenchyma

(a) retaining protoplasm at maturity
(b) having thick walls
(c) having wide lumen
(d) being meristematic

CG PMT-2007

Ans. (a) : Collenchyma differs from sclerenchyma due to the retaining protoplasm at maturity collenchyma cells contain protoplasm and do not have any intercellular spaces. Sclerenchyma is made up of dead cells with thick walls. Sclerenchyma cells do not have protoplasm, these cells are lignified and strong secondary cell wall and are usually dead at maturity.

162. Which of the following is related with transfer of food material?

(a) Xylem (b) Collenchyma
(c) Phloem (d) Parenchyma

Uttarakhand-2005

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Ans. (c) : 'Phloem' is related with transfer of food material. The main functions of these tissues (Phloem) are transports of food material and mechanical support to the plants phloem is a complex permanent tissue present in higher vascular plants.

163. Which of the following is enucleate at maturity?
(a) Cortical cell (b) Cambial cell
(c) Meristematic cell (d) Sieve tube cell

Uttarakhand-2005

Ans. (d) : 'Sieve tube cell,' is enucleated at maturity. A mature sieve cell or sieve tube element lack nucleus thus these are enucleated living cells. Sieve tubes are considered living cells without a nucleus because the nucleus of companion cells controls their functional activities. The main function of sieve tube the transport of carbohydrates primarily sucrose, in the plant.

164. Compound sieve plates are found in:
(a) Cucurbita (b) Vitis
(c) Magnolia (d) Corchorus

AP EAMCET-2003

Ans. (b) : Compound sieve plates are found in 'vitis', A compound sieve plate has more than one area. When a sieve plates consist of more than one region of pores it is known as a compound sieve tube like in vitis. In compound sieve plates are pores in the plant cell walls that facilitate transport of material.

165. Companion cells in plans are associated with :
(a) vessels (b) sperms
(c) sieve elements (d) guard cells

Haryana PMT-2004

Ans. (c) : Companion cells in plants are associated with 'sieve elements'. Each companion cell is usually closely associated with the sieve element. These cells are present in the phloem tissue of the flowering plant. The companion cells are specialized parenchymatous cells, which are closely associated with sieve tube elements.

166. The waxy substance associated with cell wall of cork cells is :
(a) suberin (b) cutin
(c) hemicelluloses (d) lignin

Haryana PMT-2004

Ans. (a) : The waxy substance associated with cell wall of cork cell is 'Suberin'.
Suberin is highly hydrophobic and its main function is to prevent water from penetrating the tissue.

167. A tissue whose living cells form the mechanical tissue of actively growing organs and whose cell walls show cellulosic unlignified thickenings often at the corners of its cells is called:
(a) Parenchyma (b) chlorenchyma
(c) collenchyma (d) sclerenchyma

WB JEE-2014
JIPMER-2000

Ans. (c) : A tissue whose living cells form the mechanical tissue of activity growing organs and whose cell walls shows cellulosic unlignified thickenings often at the corners of its cells is called 'collenchyma'.
Term Collenchyma coined by **Schleiden.** It is a living mechanical tissue.

168. Excessive aerenchyma is characteristic of :
(a) heliophytes (b) mesophytes
(c) xerophytes (d) hydrophytes

JIPMER-2001

Ans. (d) : Excessive Aerenchyma is characteristic of 'hydrophytes' in aquatic plants (hydrophytes) have large air cavities present in Aerenchyma to give support them to float on water. Hydrophytes possess special air storage parenchyma tissue, called as Aerenchyma.
For example:- *Hydrilla, Ceratophyllum, Lotus, Echhornia* etc.

169. The stalk of a plant leaf is derived from which one of the following types of plant tissue?
(a) Sclerenchyma (b) Parenchyma
(c) Chlorenchyma (d) Collenchyma

KVPY SA-2014

Ans. (d) : The stalk of a plant leaf is derived from 'collenchyma', type of plants tissue. The collenchyma occurs in layers below the epidermis in dicotyledonous plants. It consists of cells which are much thickened at the corners due to a deposition of cellulose, hemicelluloses and pectin. These cells assimilate food when they contain chloroplasts.

170. Collenchyma resembles parenchyma in being
(a) potentially meristematic
(b) partially cutinised
(c) provided with air spaces
(d) devoid of chloroplasts

AMU-1997

Ans. (d) : Collenchyma resembles parenchyma is being devoid of chloroplasts. Parenchyma cells containing chloroplasts which is called chlorenchyma. Collenchyma cell may or may not contain a few chloroplasts.
Hence, collenchyma is a correct answer.

171. The nature of sieve elements in the phloem are
(a) dead
(b) enucleate
(c) thick-walled
(d) living but non-functional.

AMU-1997

Ans. (b) : A mature sieve element possesses a peripheral cytoplasm and a large vacuole but lacks a nucleus. The functions of sieve tubes are controlled by the nucleus of companion cells.

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172. Radial conduction of water takes place by
(a) vessels
(b) vessels and tracheids
(c) phloem
(d) ray parenchymatous cells

AMU-2012

Ans. (d) : Radial conduction of water takes place by 'ray parenchymatous cells'. Transport of nutrients and water radially between the xylem and phloem by ray parenchyma cell. Radial conduction refers to the conduction of water in the horizontal direction through the xylem.
Hence, radial conduction takes place by the ray parencymatous cells of xylem.

173. Wood is the common name of
(a) phloem (b) vascular bundles
(c) cambium (d) secondary xylem

CG PMT-2006

Ans. (d) : Wood is the common name of 'secondary xylem. The inner non-functional secondary xylem is called Heart wood and the outer functional secondary xylem is known as Sapwood. Wood is the secondary xylem produced by coniferous gymnosperms and by dicotyledonous angiosperms. Wood conducts water from the roots to the leaves and it also supports the branches and crown of trees and shrubs.

174. Which of the following would be insignificant amount in xylem sap?
(a) Sugar (b) Nitrates
(c) Phosphates (d) Water

Manipal-2009
Karnataka CET-2009

Ans. (a) : 'Sugar', would be insignificant amount in xylem sap. Xylem is a vascular tissue which has the role of the conduction of water and minerals form the roots to the shoots in the plants. It is found in roots, stems and leaves of the plants.
Phloem is the tissue of the plant which transports the soluble organic substances to the various parts of the plant.
Sugar is carried by the phloem form the leaves to the other parts. Phloem tissue is involved in transport of sugar.

175. Which of the following tissue helps in the flow of water in vascular plant ?
(a) Xylem (b) Phloem
(c) Cambium (d) Sieve tube cell

DUMET-2001

Ans. (a) : 'Xylem', tissue helps in the flow of water in vascular plant. Xylem is a vascular tissue that transports water and dissolved minerals from roots to stems and leaves. It also transports the nutrients.
Xylem tissue consists of a variety of specialized, water-conducting cells known as treachery elements.

176. Simple tissue with mechanical and physiological functions in a young dicotyledonous plant is:
(a) parenchyma (b) collenchyma
(c) sclerenchyma (d) meristematic tissue

AP EAMCET-2002
JIPMER-1996

Ans. (b) : 'Collenchyma', is a simple tissue with mechanical and physiological functions in a young dicotyledonous plants. This tissue is composed by elongated living cells of uneven primary thick walls, which possess cellulose, hemicelluloses, and pectic materials. It provides support structure, mechanical strength and flexibility to the petiole, leaf veins and stem of young plants, allowing for easy bending without breakage.

177. The crunchy and granular feeling when we chew pear fruit is due to
(a) parenchyma (b) collenchyma
(c) chlorenchyma (d) sclerenchyma

CMC Ludhiana-2014

Ans. (d) : The crunchy and granular feeling when chew pear fruit is due to the ' sclerenchyma' tissue. The sclerenchyma cells are of two types-fibres and sclereids. The sclereids give a crunchy feeling to the pear because it provides support and hardens the tissue. Sclereid cells are also called "stone cells".

178. The nature of cells occurring in medulla is:
(a) parenchymatous (b) liquified
(c) suburised (d) collcnchymatous

AP EAMCET-1997

Ans. (a) : The nature of cells occurring medulla is 'parenchymatous', Medulla is also called pith. It is a ground tissue present at the central region of stele. Medulla is made up of parenchymatous cells.

179. Cell wall of xylem is rich in
(a) Starch (b) lignin
(c) lipid (d) protein

CG PMT-2010

Ans. (b) : Cell wall of xylem is rich in 'lignin'. Lignin and cellulose are found in the rigid cells. It helps in the transportation of water in stems. Presence of lignin is make up the wood of woody plants in Xylem cells.

180. Anatomically jute fibres are
(a) Xylem fibres
(b) Phloem fibres
(c) Sclerenchyma fibres
(d) Cortical fibres

CG PMT-2010

Ans. (b) : Anatomically jute fibres are 'Phloem fibres', are known as sclerenchymatous fibres, as they are made up of sclerenchyma cells. These fibres are mainly found in the phloem, so they are also called the 'phloem fibres'. It falls into the bast fibre category,

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181. The sclerenchymatous part of pericycle which gives mechanical support is called:

(a) hard bast (b) bast fibres
(c) sclereids (d) wood fibres

AP EAMCET-2000

Ans. (b) : The sclerenchymatous part of pericycle which gives mechanical support is called 'bast fibres', bast fibres are called phloem fibres, they are sclerenchymatous dead cells that provide mechanical strength to the plants.

182. An old trunk of shisham (*Dalbergia sisso*) tree would possess maximum amount of

(a) Primary xylem (b) Secondary xylem
(c) Primary phloem (d) Secondary cortex

Rajasthan PMT-2011

Ans. (b) : Maximum amount of secondary xylem is present in an old trunk of shisham. It is formed from the secondary growth of the plants. Secondary growth increases the diameter of the stem in plants. In *Dalbergia sissoo*, a vascular cambium is found, its function is to produce wood cells and bark cells, vascular cambium produces a large amount of secondary xylem towards its inner side.

183. Tracheids differs from vessels in having:

(a) Thick wall
(b) Bordered pits
(c) Discontinuous Intercalary wall
(d) Spiral thickening

Rajasthan PMT-2000
Rajasthan PMT-2006

Ans. (b) : Tracheid differs from vessels in having 'bordered pits'. Tracheids are made up of single cells, whereas vessels are made up of a group of cells. Tracheids are found in all vascular plant but vessels are only seen in angiosperms, tracheids are found less large pits while vessels are found large small pits. Bordered pits are structures found in the conductive tissues of many plants. The tracheids, which transport liquids, are dead cells.

184. The difference in phloem of gymnosperms and angiosperms is due to:

(a) Parenchyma (b) Sieve cell
(c) Companion cell (d) Fibres

Rajasthan PMT-2006,2002

Ans. (c) : The difference in phloem of gymnosperms and angiosperms is due to the 'companion cell', phloem in gymnosperms lack both sieve tubes and corresponding cells. Companion cells are attached to the sieve tubes and regulate, their activity phloem in gymnosperms doesn't have either, instead, they have sieve cells and albuminous cells for the conduction of food.

Hence, the difference in phloem of both is due to the 'companion cell'.

185. As compared to sclerenchyma, parenchyma does not function in:

(a) gas exchange
(b) nutrient transport
(c) mechanical support
(d) support and gas exchange

AP EAMCET-1999

Ans. (c) : As compared to sclerenchyma, parenchyma does not function in 'mechanical support', parenchyma has loosely packed cells that contain intercellular spaces. They store and assimilate food, they serve as a food storage tissue. Parenchyma is a permanent tissue helps in storing food in plants. Sclerenchyma provides mechanical strength. These cells are usually found associated with other cells types and give them mechanical support. Sclerenchyma is an example of a simple permanent but dead mechanical tissue. It has a cell wall that is made up of cellulose and lignin. It provides mechanical support to the plants.

186. The stele, in the root of the following is tetrarch:

(a) Nicotiana (b) Helianthus
(c) Gossypium (d) Trapa

AP EAMCET-1999

Ans. (c) : The stele, in the root of '*Gossypium*' is tetrarch, based on the number of xylem strands present in the stele, it can be different types in vascular tissue or the stele consists of three tissues, the pericycle, the xylem and also the phloem. In 'Gossypium' the tetrarch stele is found. Tetrarch stele is a stele which contain the 4 xylem strands.

187. Wilting of plant is because

(a) xylem is blocked
(b) phloem is blocked
(c) epidermis few roots are removed
(d) pith is removed

VMMC-2007
BHU PMT (Screening)-2006
UPCPMT-2002

Ans. (a) : If the Xylem is blocked, the plant will undergo wilting due to the lack of proper transport of water. The main function of the Xylem is to transport water unidirectionally from roots to tips of the plant. This will lead to loss of rigidity of cells and lead to wilting.

188. Assertion: Libriform fibres are true fibres.
Reason: Libriform fibre develop from non-functional tracheids by reduction

(a) Both Assertion and Reason are true and Reason is the explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion

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(c) Assertion is true but Reason is false
(d) Assertion is false but Reason is true

Manipal-2010

Ans. (c) : Among the following statements the assertion (A) is true but the reason (R) is false. A fibre with very thick walls and reduced simple pits are termed as 'libriform fibres', these fibres are present in phloem. Libriform fibres occur in woody dicotyledons. Libriform fibre is not developped from non-functional tracheids by reduction,

189. The longest plant cell is :

(a) fibre (b) vessel
(c) tracheid (d) sieve tube

Rajasthan PMT-2000

Ans. (a) : The longest plant cell is fibre. Fibres are greatly elongated cells whose long, tapering ends interlock, which provides maximum support to a plant fibres are the longest plant cells with the length up to 21.65 inches long. It is elongated by intercalary growth and intrusive tip growth.

190. Bast fibres obtains from which part of the stem?

(a) Cork (b) Cortex
(c) Xylem (d) Phloem

Rajasthan PMT-2000

Ans. (d) : Bast fibres are obtains from 'phloem' part of the stem. Bast fibres also called 'phloem fibres'. It is a type of plant fiber that can be collected from the phloem or bast surrounding to the stem of mainly dicotyledonous plants. They are sclerenchymatous dead cells that provide mechanical strength to plants.

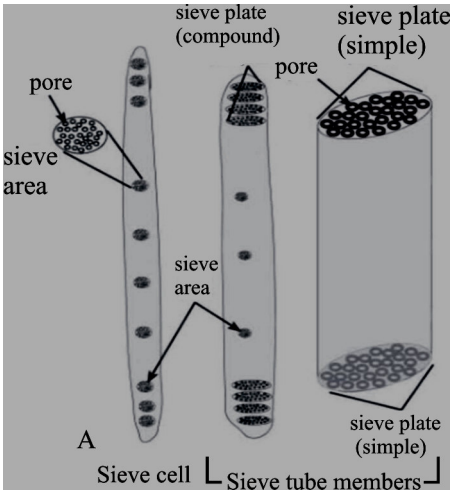
191. Which of the following is anucleated living plant cell?

(a) Sieve tube (b) Vessel
(c) Tracheid (d) All of these

AMU-2002

Ans. (a) : 'Sieve tube' is anucleated living plant cell. Sieve elements are the phloem conducting elements. The sieve elements are stacked on top of each other to form vertical sieve tubes.

The nucleus is absent in mature sieve tubes. Sieve tube elements also known as sieve tube members in plant anatomy. Sieve tubes are considered as living cells without a nucleus because the nucleus of companion cells controls their functional activities.



192. Compare the statement A and B

Statement A : Sclerenchyma cells do not have plasmodesmata

Statement B : The cell walls of some permanent tissues are heavily lignified.

Select the correct description :

(a) Both the statements A and B are wrong
(b) Statement A is correct and B is wrong
(c) Statement A is wrong and B is correct
(d) Both the statements A and B are correct

Karnataka CET-2010

Ans. (d): Sclerenchyma cells do not have plasmodesmata because they are thick and dead cells. So, there is no need for plasmodesmata in dead cells as cell to cell communication does not take place in dead cells. Parenchyma, collenchyma and sclerenchyma are types of permament tissues in which sclerenchyma is heavily lignified.

193. Study the following table:

S. No.	Tissue	Structural feature	Function
1.	Collenchyma	Cell walls with high water content	Photosynthesis in young stems
2.	Parenchyma	Suberised cell walls	Storage of food
3.	Sclerenchyma	Lignified cell walls	Strength
4.	Digestive glands	Dense cytoplasm	Breaking the substrate without water

The correct combination is:

(a) 1 and 2 (b) 2 and 3
(c) 1 and 4 (d) 1 and 3

AP EAMCET-2005
VMMC-2010

Ans. (d) : Collenchyma is a living tissue consist of a non-lignified cellulosic thick walled cell. Each cell contain an average of about 60-70% of water. The primary function of **Collenchyma** is to provide support but in young stem due to presence of chlorophyll it also take part in photosynthesis.

Sclerenchyma tissue consists of a lignified thick walled cell. It provides mechanical support to the plant.

Parenchyma typically composed of living cells that are thin walled, variable in morphology and physiology that concerned vegetative activities of plant like photosynthesis, assimilation, respiration, storage, secretion and excretion.

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Digestive glands secrete digestive juices, which contain enzyme for digestion of food. The digestive system also contains associated glands such as pancreas, liver etc. which release their secretions in the elementary canal to facilitate digestion.

Schlerenchyma cells are specialized plant cells that exist to provide strength and support. Their cell wall consists of cellulose, lignin and hemi cellulose.

194. P- proteins belong to

(a) xylem parenchyma
(b) trichomes
(c) sieve tube elements
(d) tracheids and vessels

UP CPMT-2005

Ans. (c) : Sieve tube element contains special type of protein P- proteins in which P stand for phloem. Most likely function of P- protein is sealing mechanism on wounding along with callose and it is also related with conduction of food.

• Xylem parenchyma, tracheids and vessels are the part of xylem.

Trichomes are fine outgrowths or appendages on plants, algae, lichens, and certain Protists.

195. Transport of food material in higher plants takes place through

(a) Sieve elements
(b) Companion cells
(c) Transfusion cells
(d) Tracheids

AIPMT (Mains)-2010

Ans. (a) : Transport of food material in higher plants takes place through sieve elements. They are specialized cells that are important for the function of phloem which is highly organized tissue that transports organic compounds made during photosynthesis.

- The phloem also conducts some other substances such as amino acids. The conducting cells of the phloem are cylindrical cells called **sieve tubes**, which have sieve like partitions at both ends.
- These partitions are known as **sieve plates**.

196. Which of the following tissues consist of living cells?

(a) Vessels (b) Tracheids
(c) Companion cell (d) Sclerenchyma

JIPMER-2012

Ans. (c) : Companion cells are present between sieve tubes in the phloem of angiosperm. These are the living cells with large nucleus that controls the activity of non-nucleated sieve tubes.

Companion cells function to load and unload sugars into the cavity of sieve tube members.

197. Vascular tissues in flowering plants develop from

(a) phellogen (b) plerome
(c) periblem (d) dermatogen

JIPMER-2012

Ans. (b) : Plerome is the central histogen which forms stele or part of stem and root inner to endodermis. Part of plerome the forms vascular tissues is called procambium.

Plerome represent the inner region of the apical meristem. It consists of thin-walled cells that serve as precursors for stele including the pith.

198. Companion cells are closely associated with:

(a) Trichomes
(b) Guard cells
(c) Sieve elements
(d) Vessel elements

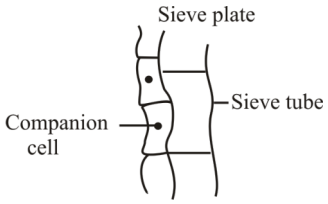
AIPMT (Screening)-2012

Ans. (c) : Companion cells are thin walled elongated cell which is associated with sieve tube.

They are associated with sieve elements through plasmodesmata and they together help in the transport mechanism in plants.

Companion cells are present only in angiosperm.

Pteridophytes and gymnosperms do not have companion cell.



199. Closely and compactly arranged fundamental tissue is not found in

(a) Prothallus of *Pteris*
(b) Medulla of dicot stem
(c) Columella of *Funaria*
(d) Adaxial Mesophyll of *Nerium*

AP EAMCET-2010

Ans. (b) : Pith (Medulla) of dicot stem occupies the large central part of the dicot stem. It comprises thin walled parenchyma cell with inter cellular air space.

Prothallus of *Pteris* – Prothallus of *pteris* is a single layered cellular structure having rhizomes at its ventral surface of the thalloid body.

Columella of *Funaria* – Columella is the middle region consisting of parenchyma cell. It is found within the sporangium it act as a conducting tissue.

Adaxial Mesophyll of *Nerium* – Both the adaxial and abaxial epidermis in *nerium* are multiseriate, being composed of up to three layers of compactly arranged cell with heavily cutinized outer walls.

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D. Epidermal, Ground, Vascular Tissue System

200. Sunken stomata are found in

(a) Nerium (b) Hydrilla
(c) mango (d) none of these

Manipal-2008
BVP-2008
Punjab MET-2008,2006
Uttarakhand PMT-2007
JCECE-2003
Rajasthan PMT-2002
J&K CET-2006

Ans. (a) : Suken stomata is a stomata in a small pit which protects the escaping water vapour from air currents decreasing water loss from the leaf.

- Sunken stomata are commonly found in leaves of Nerium this is an adaptation of the leaves to reduce excessive transpiration.
- Each stomata remains surrounded by two semilunar guard cells. The guard cells are living and contain chloroplasts they regulate opening and closing of stomata.

201. Vascular bundles, in which phloem is found on both sides of xylem are called

(a) collateral (b) bicollateral
(c) radial (d) amphicribral

HP CET-2011
JCECE-2008
Punjab MET-2007
BCECE-2006
VMMC-2005
AMU-2004
J&KET-2011,2003
BVP-2003
Rajasthan PMT -2001

Ans. (b) : Bicolateral vascular bundle have xylem and phloem present on the same radius and phloem is found in both the side of xylem. In vascular bundle plants are made up of conducting tissue of the xylem and the phloem. In collateral vascular bundle xylem and phloem are present on the same radius. The phloem is present on the outer side of xylem.

202. The cells without nuclei are present in :

(a) vascular cambium
(b) root hair
(c) companion cell
(d) members of sieve tube

Punjab MET-2006
J&K CET-2006
JCECE-2003
Rajasthan PMT-2002

Ans. (d) : The cell without nuclei are present in member of sieve tube elements are important component of phloem. They are devoid of a nucleus at maturity. This is normally associated with one or more nucleated companion cells to which they are connected by plasmodesmata.

203. Which is a useful product of epidermal origin?

(a) Saffron (b) Cotton fibres
(c) Clove (d) Jute

JIPMER-2012
Uttarakhand PMT-2009
BVP-2009
VMMC-2009

Ans. (b) : Cotton fibres is chiefly composed of epidermal hairs of seeds and present on the surface of seeds of Gossypium species. These are made up cellulose only and may be of two type i.e extractable and non extractable fluffy fuzz. Cotton fibres are mainly used for textiles celluloid, rayon and paper pulp.

204. When the vascular cambium is present between the xylem and phloem, then the vascular bundle is called,

(a) Closed (b) Exarch
(c) Open (d) Endarch

Karnataka CET-20.05.2023

Ans. (c) : In gymnosperms and dicot stems a strip of vascular cambium occurs between phloem and xylem of each vascular bundles. It is called intrafascicular cambium. This strip of vascular cambium later produces secondary tissues. Such vascular bundles are described as open vascular bundle.

205. Sunken stomata are in the leaves of

(a) Hydrilla (b) Nerium
(c) Typha (d) Salvinia

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : Sunken stomata are found in xerophytes. That they plant grow on desert condition Ex:- Nerium

- Sunken stomata prevent the water loss through respiration.
- Hydrilla is hydrophylic plant.
- Typha is a monocotyledonous flowering plant. It can be used as a source of starch to produce ethanol.
- Salvinia is a aquatic pteridophytes.

206. Which of the following characters are found in Hydrilla stem

(I) Aerenchyma
(II) Sunken stomata
(III) Palisade tissue
(IV) Xylem cavity

Correct answer is

(a) I and II (b) I and IV
(c) III and IV (d) IV only

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : Aerenchyma isa modified parenchymatous tissue containing air chambers between cells. It provide buoyancy to aquatic plants like hydrilla.

207. Select the incorrect statements related to anatomical characters from the following

(I) Endodermis is a part of the stele
(II) Endodermis with casparian strips are found in the dicot stem
(III) Bulliform cells are found in the upper epidermis of the isobilateral leaf.
(IV) Vascular bundles are open in monocot stems.

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(a) I, II, IV (b) I, II, III
(c) II, IV (d) III, IV

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : • The endodermis is the innermost layer of the cartex and is not a component of stele.
• Casperian strips are present in dicot roots.
• Open vascular bundles are present only in dicotyledonous plants.

208. Match the arrangement of vascular tissues with the type of steles below.

	List-I		List-II
A.	Stele with medulla surrounded by xylem and phloem	I.	Protostele
B.	Dissected Medullated Stele with overlapping leaf gaps	II.	Siphonostele
C.	Medullated stele with non overlapping leaf gaps	III.	Solenostele
D.	Non-medullated stele with xylem surrounded by phloem	IV.	Dictyostele

(a) a-III, b-IV, c-II, d-I
(b) a-III, b-II, c-I, d-IV
(c) a-II, b-IV, c-I, d-III
(d) a-II, b-IV, c-III d-I

TS EAMCET-11.05.2023, Shift-II

Ans. (d) :

A.	Stele with medulla surrounded by xylem and phloem	II.	Siphonostele
B.	Dissected Medullated Stele with overlapping leaf gaps	IV.	Dictyostele
C.	Medullated stele with non overlapping leaf gaps	III.	Solenostele
D.	Non-medullated stele with xylem surrounded by phloem	I.	Protostele

209. Xylem development is poor in
(a) Xerophytes (b) Halophytes
(c) Hydrophytes (d) Mesophytes

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : Xylem of hydrophytes is poorly developed. Vessels in the hydrophytes are completely are completely absent but traches are well developed.
• In aquatic plants, water can be taken in through the leaves, stems and roots through osmosis, making the vascular system less needed.

210. Match the following?

Vascular bundles	Arrangement	Plants
(a) Open	(i) Different radial	(p) Leaves
(b) Closed	(ii) Same radial	(q) Dicots
(c) Radial	(iii) Cambium present	(r) Monocots
(d) Conjoint	(iv) Cambium absent	(s) Root

(a) (a–iv–p), (b–ii–r), (c–iii–q), (d–i–s)
(b) (a–iii–q), (b–iv–r), (c–i–s), (d–ii–p)
(c) (a–i–p), (b–ii–q), (c–iii–r), (d–iv–s)
(d) (a–ii–r), (b–i–p), (c–iv–s), (d–iii–q)

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : Monocot stem → collateral, conjoint, closed, endarch cambium.
Monocot root → radial vascular bundles.
Dicot stem → collateral, conjoint, open and endarch.
Dicot root → radial vascular bundle.

211. Identify the incorrect statements among the following.
(A) Epidermal cells are parenchymatous and have small amount of cytoplasm
(B) Gymnosperms have vessels in their xylem
(C) In bicollateral vascular bundle, phloem is present on either side of cortex
(D) Root endodermal cells have deposition of water impermeable, suberin as casparain strips
(a) A, B
(b) B, C
(c) C, D
(d) A, C

TS EAMCET-10.08.2021 Shift-I

Ans. (b) : Gymnosperms lack vessel in their xylem.
• In bicollateral vascular bundles, phloem patches remain on both sides of the xylem.

212. Which one of the following is not a type of protostele ?
(a) Haplostele (b) Actinostele
(c) Plectostele (d) Atactostele

Tripura JEE-2021

Ans. (d) : Atactostele is not a type of protostele. Atactostele refers to a type of eustele found in monocots, in which the vascular tissue in the stem exists as scattered bundles.

213. Bicollateral bundles means:
(a) they have phloem both on outer and inner side of xylem
(b) they have xylem both on outer and inner side of phloem
(c) both (a) and (b)
(d) none of the above

Rajasthan PMT-1997
AP EAMCET-05.10.2021 Shift-I

Ans. (a) : Bicollateral vascular bundles means they have xylem both on outer and inner side of phloem. This, all of them lie within the same radius. Apart from phloem, vascular cambium is also present on both sides of the xylem.

214. Velamen is found in _____
(a) Roots of screwpine
(b) Aerial and terrestrial roots of orchids
(c) Leaves of Ficus elastica
(d) Aerial roots of orchids

AP EAPCET-07.09.2021 Shift-I

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Ans. (d) : Epiphyte is an organism that grows on the surface of the plant but does not derive nutrition or moisture from them. Majority of orchids are epiphytes. All epiphytic orchids and Vanda (a genus in the Orchid family) have a spongy tissue called velamen which is made up of multiple epidermis that covers the roots. Their roots are aerial and can perform photosynthesis by absorbing moisture and carbon dioxide from the air. Epiphytes are not parasites as epiphyte does not absorb nutrients from the host plant, unlike parasites.

215. Large, empty colourless cells of the adaxial epidermis along the veins of grass leaves are

(a) Bulliform cells
(b) Lenticels
(c) Guard cells
(d) Bundle sheath cells

NEET-2020 Phase-II

Ans. (a) : During times of stress, bulliform cells assist in the rolling of leaves to avoid water through transpiration.

- Bulli form cells or motor cells are large, bubble shaped epidermal cell that occur in group on the upper surface of the leaves of many monocots. These cells are present on the upper (adaxial) surface of the leaf.

216. Dumb-bell shaped guard cells are found in

(a) Vinca (b) Beetle
(c) Pea (d) Grass

AP EAMCET-24.09.2020 Shift-II

Ans. (d) : Dumb-bell shaped guard cells are found in Grasses. Grasses are monocotyledons and are classified as either Gramineae or Poaceae. Cereals including wheat, rice, corn, barley, millets etc.

217. Which one of the following codons will NOT pair with anticodon of t-RNA ?

(a) AUU (b) UAG
(c) UUU (d) CUC

MHT CET-06.10.2020 Shift-I

Ans. (b) : UAG UAA UGA stops condons in genetic code. They are also called non sense or termination codon as they do not code for any amino acid.

218. Xylem translocate

(a) Water and mineral salts only
(b) Water, mineral salts and some organic nitrogen only
(c) Water, mineral salts, some organic nitrogen and hormones
(d) Water only

NEET-2019

Ans. (c) : Xylem is transport water and minerals, it also translocates organic nitrogen and some hormones in a plant.

- Xylem parenchyma is irregular shape and main function storage of food.
- Vessel is a non-living, thick walled and it play vital role in translate of H_2O.

219. Phloem in gymnosperms lacks:

(a) Sieve tubes only
(b) Companion cells only
(c) Both sieve tubes and companion cells
(d) Albuminous cells and sieve cells

NEET-2019

Ans. (c): The sieve element is a sieve cell in gymnosperms and other primitive vascular plants, while the associated cell is referred to as in albuminous cells.
The sieve tube and the associated cells are absent from the phloem of gymnosperm, instead, they have sieve cells for the conduction of dietary material.

220. _____is composed of single layer of barrel shaped parenchymatous cells and forms a complete ring around the stele.

(a) Endodermis (b) Rhizodermis
(c) Epidermis (d) Epiblema

SRM JEEE-2018

Ans. (a) : Endodermis is composed of single layer of barrel shaped parenchymatous cells and forms a complete ring around the stele.

221. In which type of vascular bundles are Xylem and Phloem present at the same radius?

(a) Radial (b) Closed
(c) Conjoint (d) Exarch

Karnataka CET-2018

Ans. (c) : Vascular bundle with phloem and xylem present on the same radius is called conjoint. Xylem and phloem are collectively known as vascular bundles. Xylem transport water and minerals from the roots to the entire plant body while phloem has the responsibility to transport the organic food inside the body of the plant.

222. The vascular cambium normally gives rise to

(a) Phelloderm (b) Primary phloem
(c) Secondary xylem (d) Periderm

NEET-2017

Ans. (c) : Vascular cambium gives rise to secondary xylem and secondary phloem during secondary growth.

- Vascular cambium is a layer of meristmatic tissue which is present between the primary xylem and primary phloem.
- Phelloderm is formed by cork cambium.

223. Which of the following is made up of dead cells?

(a) Xylem parenchyma (b) Collenchyma
(c) Phellem (d) Phloem

NEET-2017

Ans. (c) : Phellem or cork is a tissue formed on the outer side of the cork cambium. It is composed of dead cells and is impermeable to water due to suberization.

- **Xylem parenchyma** is the only xylary element which consists of living cells.
- **Collenchyma** are living cell having thick deposits of cellulose in their cell walls.
- Phloem are living components of vascular bundles.
- However in xylary elements, tracheids, vessels and fibers are non-living components while parenchyma are living.
- Phloem consists of living components like companion cells, sieve tube cells and parenchyma cells but phloem fibers or bast fibers are dead elements.

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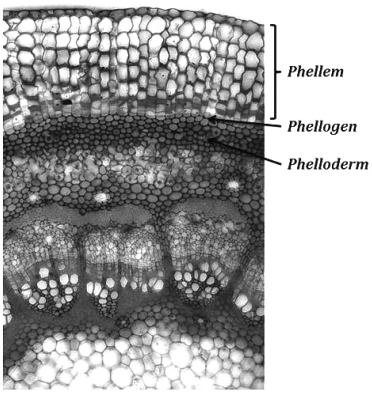

Formation of Periderm

224. Multiple epidermis on dorsal and ventral side of the leaf is found in

(a) Zea mays (b) Triticum aestivum
(c) Mangifera indica (d) Nerium oleander

CG PMT-2007

Ans. (d) : In nerium leaf multi layered numerous small opening called stomata are found in the epidermal layer of the leaves stomata are found in most abundance in the lower epidermis of the dorsiventral leaf they are sometimes together absent.

225. A vascular bundles without pith is

(a) Protostele (b) Siphonostele
(c) Solenostele (d) None of these

BCECE-2008

Ans. (a) : A vascular bundle is without pith is called protostele, which consists of xylem and surrounded by phloem and pericycle. Protostele is most primitive stele it consists of a solid core of xylem surrounded by the phloem and the pericycle. Protostele is a type of stele, in which the vascular tissue in the stem forms a solid core, with no central pith.

226. A few drops of sap were collected by cutting across a plant stem by a suitable method. The sap was tested chemically. Which one of the following test results indicates that it is phloem sap?

(a) Acidic
(b) Alkaline
(c) Low refractive index
(d) The absence of sugar

NEET-2016 Phase-II

Ans. (b) : The phloem sap is alkaline in nature with pH ranging from 7.3 – 8.5 and contains high levels of K^+ and Mg^{2+}. Hence the chemical test for alkalinity will help to identify that the exudated sap is phloem sap, as protons are pumped from companion cells to the neighbouring cells for the translocation of the sugars.

227. Meristematic tissue in vascular bundle is

(a) phellem
(b) procambium
(c) interfascicular cambium
(d) fascicular cambium

JIPMER-2008

Ans. (d) : The cambium present between the xylem and phloem of the vascular bundle is called vascular fascicular cambium. The vascular cambium is the main growth tissue in the stems and roots of many plants, specifically in dicots such buttercups and oak trees, gymnosperms such as pine trees, as well as in certain other vascular plants.

228. Opening and closing of stomata is due to the : -

(a) Hormonal change in guard cells
(b) Change in Turgor pressure of guard cells
(c) Gaseous exchange
(d) Respiration

AIPMT-2002

Ans. (b) : Opening and closing of stomata take place due to turgor pressure that changes in guard cells. As the solute particles enter the guard cells from the epidermal and mesophyll cells, both the osmotic potential and the water potential of the guard cells get lowered and potassium ions (K^+) enter the guard cells. This creates a water potential gradient which makes the water moves towards the guard cell, it creates a hydrostatic pressure in the guard cell and thus becomes turgid and swell in size which causes stomata opening. With a decline in guard cells solutes, water moves out of the guard cells, making them flaccid, this occurs because potassium ions move back out of the guard cell, so stomata closed.

229. Peroxisomes are found in

(a) bundle sheath (b) endosperm
(c) mesophyll cells (d) vascular bundles

Manipal-2010

Ans. (c) : Peroxisomes found in all eukaryotic cells. It is small organelles found in the photosynthetic mesophyll cells in plant. They play vital role in the process of photorespiration. These are also involved in metabolism, development, and responses to stresses. Peroxisomes are the sole site of fatty acid β- oxidation in plant cells.

230. Idioblasts are specialized, non-green large sized

(a) Sclerenchyma cells
(b) Parenchyma cells
(c) Colenchyma cells
(d) Aerenchyma cells

UP CPMT-2013

Ans. (b) : Idioblasts are specialized, non-green large sized parenchyma cells. It is a type of simple permanent tissue that makes a major part of ground tissues in plants, where other tissues such as vascular tissues are embedded.

231. Non-cellular layer that connects inner surface of the epithelial tissue to the connective tissue is

(a) Endodermis
(b) Cuticle
(c) Connective tissue
(d) Basement membrane

UP CPMT-2013

Ans. (d) : Epithelial tissue is separated from the underlying tissue by a non-cellular layer called the basement membrane. The basement membrane is a thin, non-cellular tissue with blood vessels present underneath on which the epithelium sits.

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232. At maturity the sieve plates become impregnated with

(a) Cellulose (b) Pectin
(c) Suberin (d) Lignin
(e) Callose

BCECE-2012
Kerala PMT-2009

Ans. (e) : Sieve elements are " semi - alive" at maturity. They lose their nucleus and other organelles but other organelles but retain the endoplasmic reticulum, mitochondria and plastids.

233. Periderm is formed by

(a) phellem (b) phelloderm
(c) phellogen (d) All of these

JCECE-2014, 2010

Ans. (d) : The periderm is a protective tissue that is formed during secondary growth in the stems, branches and roots of most dicotyledons and gymnosperms. Periderm composed of phellem, phellogen and phelloderm.

- Phellem are also called suberized cells which develop outside of the plant. They protect plants from the penetration, ingestion by animals, temperature changes, excessive evaporation etc.
- Phellogen is also called cork cambium and it is the meristematic layer that is responsible for the development of periderm.
- The phelloderm are the parenchyma cells, which are derived from the phellogen.

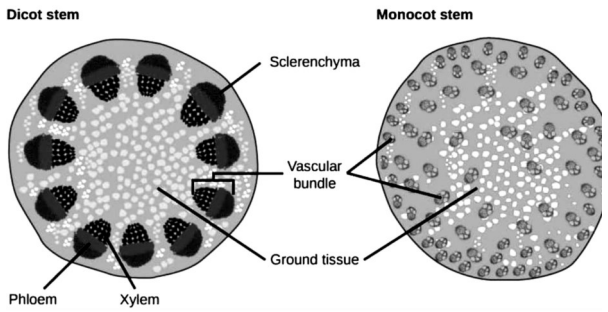
234. Vascular bundles in monocotyledons are considered closed because:

(a) Cambium is absent
(b) There are no vessels with perforations
(c) Xylem is surrounded all around by phloem
(d) A bundle sheath surrounds each bundle

AIPMT-2015

Ans. (a) : Vascular bundles in monocotyledons are considered as closed because cambium is absent in the vascular system and thus they lack secondary growth in the thickness.

• The xylem and phloem are the two vascular tissues found in plants. Xylem is specialized tissue that involves in the water transportation and movement of nutrients from root to tip of the leaves of a plant. The xylem is present in the inner surface and phloem in the outer surface and cambium is not present in monocot plants.



235. Tracheids differ from other tracheary elements in

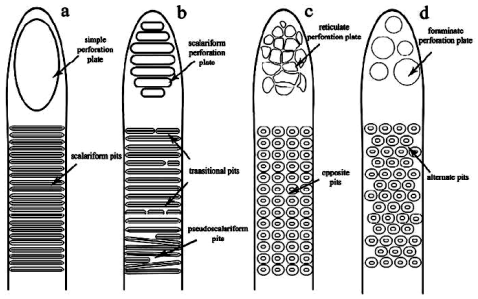
(a) having casparian strips
(b) being imperforate
(c) lacking nucleus
(d) being lignified

AIPMT-2014

Ans. (b) : Tracheids and vessels are two type of Tracheary elements of xylem tissue. The main function of treachery elements is ascent of sap. Tracheids have imperforated cells thus keeps the sap longer in them while vessels are highly perforated. Example-

1. Simple
2. Scalariform
3. Reticulate
4. foraminate.

Vessels have various types of perforations. As there is no perforations in tracheids the cells are less sufficient for transportation while vessels are more sufficient in carrying the sap.

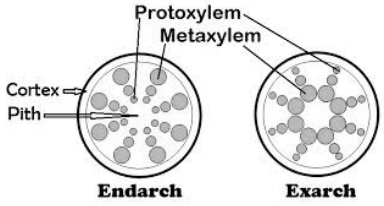


236. You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will you use to distinguish between the two?

(a) Secondary xylem (b) Secondary phloem
(c) Protoxylem (d) Cortical cells

AIPMT-2014

Ans. (c) : Protoxylem develops during the primary growth of a plant. In stems the protoxylem lies towards the centre (pith) and the **metaxylem lies towards the periphery**. This type of primary xylem is called **endarch**. In root, the protoxylem lies towards periphery and metaxylem lies towards the centre, such arrangement is called **Exarch**.



237. A common structural feature of vessel elements and sieve tube elements is-

(a) Thick secondary walls
(b) Pores on lateral wall
(c) Presence of P-protein
(d) Enucleate condition

JCECE-2013
AIPMT-2006

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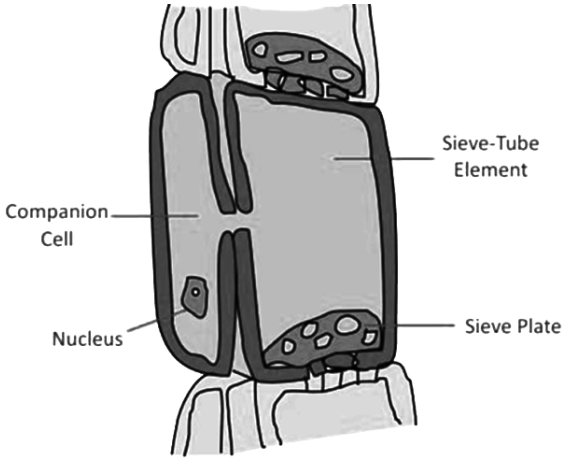
Ans. (d) : Vessels are a part of xylem whereas sieve tube is an element of phloem. The water- conducting xylem vessel elements are dead but sieve tube elements are living cells. They lose their nucleus on maturity and attain the enucleate condition. So, the common structural feature of vessel elements and sieve tube elements is enucleate condition.

238. In the sieve elements, which one of the following is the most likely function of P-proteins ?

(a) Deposition of callose on sieve plates
(b) Providing energy for active translocation
(c) Autolytic enzymes
(d) Sealing mechanism on wounding

AIIMS-2006

Ans. (d) : Phloem protein is another name for P-protien. The most important **function of P-protein is the sealing mechanism on wounding**. They generally play a role during an unfavorable condition where they quickly aggregate at the sieve plate to form a clot when the sieve element is disrupted. It prevents the flow of the phloem sap.

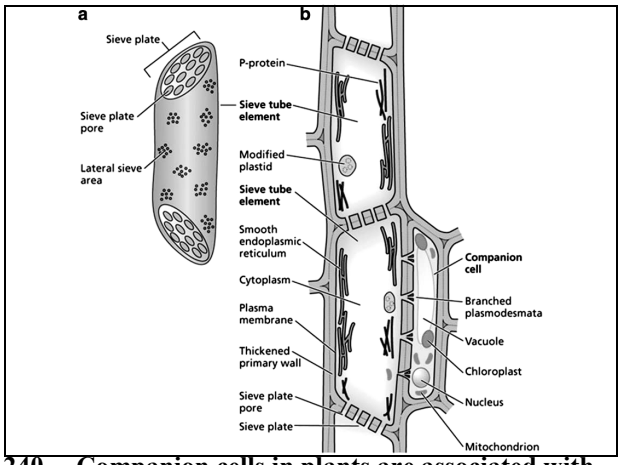


239. Which one of the following statements pertaining to plant structure is correct?

(a) cork lacks stomata, but lenticels carry out transpiration
(b) passage cells help in transfer of food from cortex to phloem
(c) sieve tube elements possess cytoplasm but no nuclei
(d) the shoot apical meristem has a quiescent centre

AIIMS-2005

Ans. (c) : Sieve tube elements are the relative type of phloem cells found is angiosperms. Mature sieve tube elements are deep, tublar and do not contain nucleus in the cells with no secondary wall and terminal sieve plate.

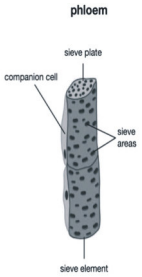


240. Companion cells in plants are associated with

(a) Vessels (b) Sperms
(c) Sieve elements (d) Guard cells.

AIIMS-2004

Ans. (c) : Companion cells are present in the phloem tissue of the flowering plant. This tissue is a special type of parenchyma cells. These cells are closely associated with the sieve tubes elements. They are connected via cytoplasm of companion cells and plasmodesmata.



241. A narrow layer of thin walled cells found between phloem/bark and wood of a dicot is

(a) cork cambium (b) vascular cambium
(c) endodermis (d) pericycle.

AIPMT-1993

Ans. (b) : A narrow layer of thin walled cells found between phloem/bark and wood of a dicot is vascular cambium. Vascular cambium helps in secondary growth in dicot root and stem.

242. A bicollateral vascular bundle is characterised by

(a) phloem being sandwiched between xylem
(b) transverse splitting of vascular bundle
(c) longitudinal splitting of vascular bundle
(d) xylem being sandwiched between phloem.

AIPMT-1992

Ans. (d) : Bicollateral vascular bundle is characterized by the xylem being sandwiched between phloem. Here two patches of phloem found on either side of xylem. These types of bundles occur in cucurbitaceae.

243. Amphivasal or leptocentric vascular bundles are found in

(a) Maize and wheat
(b) Helianthus and Cucurbita
(c) Dracaena and Yucca
(d) Cycas and Dryopteris

JIPMER-2002

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Ans. (c) : When xylem surrounds the phloem tissue from all sides the vascular bundle is called as 'amphivasal or leptocentric vascular bundle'. Such vascular bundles are seen in monocot plant, like Dracaena and Yucca. Bicollateral vascular bundles are seen in Helianthus and Cucurbita.
Maize and wheat-collateral closed vascular bundles.
Cycas and Dryopteris - Amphicribal vascular bundles.

244. A component of xylem is
(a) sieve tube (b) medullary ray
(c) sclereid (d) tracheid

CG PMT-2005

Ans. (d) : Xylem consists of tracheids, vessels, parenchyma, and fibers. Vessels consist of vessels elements joined together in files by large perforation plates, large gaps in the end walls between successive vessel elements, while tracheids have tapering ends that overlap with adjacent cells, and lack perforation plates.

245. Plasmodesmata is usually observed between
(a) Sieve tubes and Bast fibre
(b) Trachea and Phloem fibres
(c) Xylem parenchyma and xylem fibres
(d) Sieve tubes and companion cells

Karnataka CET-2013

Ans. (d) : Phloem is a complex tissue that helps in the conduction of food from the leaves to other parts of the plant. Sieve tubes and companion cells are integral components of phloem. Sieve tubes have no cell nucleus, ribosomes, or vacuoles. Thus, they depend on companion cells. So, plasmadesmata connection is usually observed between Sieve tubes and companion cells and it help is the translocation of food.

246. Cotton is :
(a) epidermal tissue system
(b) vascular tissue system
(c) meristematic tissue system
(d) ground tissue - system

DUMET-2002
Punjab MET-2011

Ans. (a) : Cotton is obtained from the epidermal tissue system. This system forms the outermost layer or surface of the entire plant body. The cotton is soft, fluffy, unicellular epidermal lint hair or fibers that grow out around the seed of the cotton plant. The cotton fibers are made up of cellulose.

247. Damaged sieve tubes are sealed by deposition of:
(a) pectin (b) callus
(c) suberin (d) lignin

DUMET-2004

Ans. (b) : Damaged sieve tubes are sealed by deposition of callus. Lignin is an organic compound of high carbon content. The impregnation with lignin usually starts in the intercellular lamella and then spreads centripetally through the primary and secondary walls e.g., xylem cells. Pectic substances (protopectin, pectin, pectic acid) constitute the intercellular substance that binds together the wall of individual cells. Suberin occurs in association with cellulose in cork cells of periderm, endodermis and exodermis of many plants.

248. In bicollateral vascular bundle the tissues found from out to inner side will be:
(a) outer phloem, outer cambium, xylem, inner cambium and inner phloem
(b) outer phloem, inner phloem, outer cambium, inner cambium, xylem
(c) all of above
(d) none of the above

Rajasthan PMT-1997

Ans. (a) : Bicollateral vascular bundles have xylem and phloem present on the same radius and phloem is found on both the sides of xylem. Apart from phloem, vascular cambium is also present on both the sides of the xylem.

249. Casparian strip is found in:
(a) vascular bundle
(b) between stem and root
(c) radial and inner wall of endodermis
(d) none of the above

AMU-2011
Rajasthan PMT-1997

Ans. (c) : Casparian strips are the ring-like cell wall modifications found in the root of the endodermis of vascular plants. It acts as a barrier to harmful chemicals like herbicides.
• It is found in the radial and inner wall of endodermis. Endoderm forms the central and innermost layer of cortex in terrestrial plants.

250. The term leptome is used for
(a) xylem (b) phloem
(c) endodermis (d) pericycle

Rajasthan PMT-2003

Ans. (b) : Term Leptome is used for phloem by Haberlandt. It has function similar to phloem is higher plants i.e. conduction of food material.

251. Mature sieve tube lacks :
(a) nucleus
(b) nucleus and chloroplast
(c) nucleolus and ER
(d) all of the above

Rajasthan PMT-2001

Ans. (a) : Sieve tubes are thin, walled living cells made up of sieve tube elements. Its cytoplasm lacks nucleus.
• Sieve tube element develops from a common initial cell along with companion cell (with nucleus).

252. Angiospermic companion cell is associated with :
(a) sieve tube
(b) vessels
(c) tracheids
(d) gymnospermic tracheids

Rajasthan PMT-2001

Ans. (a) : Companion cells are characteristic components of phloem tissue, which are closely associated with the sieve tubes (sieve elements) in the angiosperms. Both are linked ontogenically, as they originate from the same mother cell. The sieve tubes and companion cells maintain close cytoplasmic connections via plasmodesmata.

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253. Removal of ring wood of tissue outside the vascular cambium from the tree trunk kills it because

(a) water cannot move up
(b) food does not travel down and roots become starved
(c) shoot become starved
(d) annual ring are not produced

BVP-2008
UPCPMT-2002

Ans. (b) : If a ring of tissue outside vascular cambium is cut then secondary phloem is removed sugars cannot travel from aerial photosynthesizing parts of plants to roots which are non photosynthetic. Consequently roots are killed and the plants dies.

254. Pith is absent in

(a) Protostele (b) Eustele
(c) Amphiphloic stele (d) Ectophloic stele

WB JEE-2008

Ans. (a) : Protostele is a type of stele in which the vascular tissue in the stem forms a solid core, with no central pith.

• The stele without pith is protostele, which consists of a solid core of xylem surrounded by the phloem and pericycle. The protostele is most primitive stele.

255. One of the characteristic of sieve tube is

(a) It is a part of phloem
(b) Function is transport of inorganic solutes
(c) It is dead cell
(d) Sieve plate is not present

WB JEE-2008

Ans. (a) : Phloem is composed of sieve tubes, phloem parenchyma, phloem fibres and sclereids. It is a food conducting tissue. Sieve tubes are tubular cells with perforated cells. They are living but do not have a nucleus.

256. In the following pairs, where do you get lignin in both the element?

(a) Tracheid and collenchyma
(b) Sclerenchyma and sieve tube
(c) Sclerenchyma and trachea
(d) Parenchyma and endodermis

WB JEE-2008

Ans. (c) : The walls of sclerenchyma and the walls of xylem cells are lignified. This allows the xylem to withstand pressure changes as water moves through the plant. Sclerenchyma provides mechanical strength to plants. On maturation the cell walls become strong, rigid and impermeable to water due to the thick deposition of lignin.

257. A distinguishing feature of latex cells is that they are

(a) single-celled elements with anastomosing (fusing) branches
(b) single-celled elements with non anastomosing branches
(c) multi-celled elements with anastomosing branches
(d) multi-celled elements with non anastomosing branches

AMU-2014

Ans. (b) : Latex cells also called as non-articulate latex ducts means they do not make joint.

Latex cells are single or independent units with non-anastomosing branches. They originate as minute structures and then, with the growth of the plant, elongate and branch, ramifying in all directions through the tissues of the plant, but without fusing together it forms a network as in calotropis stem. *Nerium odorum, Thevitia nerifatolia*.

258. Amphivasal vascular bundles are found in the stem of:

(a) Beta (b) Cucurbita
(c) Dracaena (d) Boerhaavia

AP EAMCET-1998
JIPMER-1998

Ans. (c) : Amphivasal vascular bundles are found in the stem of Dracaena. A vascular bundle in which xylem encircles the central strand of phloem is known as amphivasal bundle, also called leptocentric bundle. Ex. Dracaena and Yucca.

259. Which of the following have living cytoplasm?

(a) Vessels (b) Tracheids
(c) Sclerenchyma (d) Companion cells

VMMC-2011

Ans. (d) : The companion cells are thin walled elongated specialised parenchymatous cells which are closely associated with sieve tube elements through compound plasmodesmata.

260. Stomata are also called as:

(a) stomates (b) lenticels
(c) hydathods (d) bark

Rajasthan PMT-2004

Ans. (a) : Stomata are structure present in the epidermis of leaves, each stomata regulate the process of transpiration and gaseous exchange.

• Stomata are usually found in plant leaves but they can also be found in some stems.

261. Epidermis and epiblema develops from:

(a) phellogen (b) periderm
(c) protoderm (d) calyptrogen

BHU PMT-2002

Ans. (c) : Epidermis and epiblema develops from protoderm cells are long give rise 1° vascular bundle 1° xylem, 1° phloem Intra fascicular cambium.

• Periderm the cork cells are phellom cork cells are phallogen secondary cortex or phelloderm jointly called the periderm.

262. Endodermis is a part of:

(a) pericycle (b) cortex
(c) epidermis (d) none of these

Rajasthan PMT-1996

Ans. (b) : Endodermis is a part of cortex the ground tissue found beneath the epidermis which surrounds the central cylinder and is delimited from the cylinder by the endodermis is called the cortex.

Pericycle → Pericycle absent in monocot stem and outer most layer of the stele found below the epidermis.

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263. The cotton thread fibres are
(a) fibres taken out from stem
(b) epidermal hairs of seed
(c) epidermal hairs of fruits
(d) fibres taken out from roots

UP CPMT-2010

Ans. (b) : : Fibre elongated end wall tapering lignified lumen empty.
• Cotton thread fibres obtained from *Gossypium arboreum* and *G. herbaceum* found in seed surface.
• Cotton fibers are natural hollow fibers: They are soft, Cool, Known of breathable fibers and absorbent.

264. Which of the following is a calcium carbonate?
(a) Raffides (b) Druces
(c) Cystolith (d) All of these

AFMC-2000
UP CPMT-2010
BHU PMT (Screening) 2007

Ans. (c) : Calcium corbonate is found in cystolith. The crystals of $CaCO_3$ called the cystolith and cells called lithocyte the crystals of calcium oxalate in the form of needles called Raphides and in the form star and druses.

265. Two cross-sections of stem and root appear simple, when viewed by naked eye. But under microscope the can be differentiated by
(a) exarch condition of root and stem
(b) endarch condition of stem and root
(c) endarch condition of root and exarch condition of stem
(d) endarch condition of stem and exarch condition of root

AMU-2005
Manipal-2004

Ans. (d) : In endarch condition when Protoxylem lies towards the centre and metaxylem towards the pheriphery the condition of xylem is called endarch as stem.
• Exarch→ When protoxylem lies towards pheriphery and metaxylem towards the centre condition is called exarch as root.

266. Protoxylem lacunae occur in
(a) cladodes
(b) underground stems
(c) vascular bundles of grass stem
(d) climbers

BHU PMT (Mains)-2009

Ans. (c) : Protoxylem lacuanae occur in vascular bundles of grass stem. In the protoxylem of monocot vascular bundles some of the protoxylem cells disintegrate and form in to a lysogenous cavity called protoxylem lacunae. It stores water so it is also called water cavity.

267. Periblem forms : (1) endodermis (2) epidermis (3) cortex (4) cuticle
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (d) : Endodermis:- This is uniseriate layer of cells delimiting the cortex from stole. It consists of barrel shaped cells arranged quite close to each other having no inter cellular spaces amoung them. The cells are endodermis and elongated and arranged parallel to the long axis of the vascular tissue.
Function of endodermis:- There is great controversy about the function of the endodermis storage of starch grain.
Cortex generally is present in dicot stem, ground stem, and monocot stem. Cortex in the root, Extends from hypodermis to the endodermis, multilayered thin walled parenchymatous living cells.

268. Select the correct match from the table.

List I	List II
1. Epidermis	A. Outermost layer of parenchyma covered by a thin cuticle
2. Hypodermis	B. Immediately below the vascular bundles
3. Ground tissue	C. Parenchymatous cells enclosed by the hypodermal layer
4. Vascular bundles	D. Scattered in the hypodermis

(a) 1,2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (d) : Epidermis:- The epidermis usually consists of single layer of cells which cover outer surface of the plant body.
Hypodermis-: Found below the epidermis few layered in herbaceous dicot stem consist of collenchyma.
Ground tissue:- The ground tissue derived from the ground meristem are plerome and periblem of embryonal layers.
Vascular bundle:- Part of the transport system is vascular plants.

269. For a successful graft, the adhesion between the scion and stock is essential. In your view which of the following is the earliest event towards a good graft?
(a) Production of plasmodesmata in the cells at the interface of scion and stock
(b) Co-ordinated differentiation of vascular tissue between the stock and scion
(c) Regeneration of cortex and epidermis over the union of stock and scion
(d) Production of callus tissue between the cells of scion and stock

JIPMER-1998

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Ans. (b) : For a successful grafting the adhesion between the scion and stock is essential.Stock is a rooted stem in to which a scion orbed is grafted and the portion of the mixture provides the root.
Scion is living plant component that is detached and grafted to the stalk during the grafting process.

270. A common feature shared by guard cells and mesophyll cells is:
(a) presence of chloroplasts
(b) dumb – bell shaped structure
(c) differentially thick cell wall
(d) uniformly thin cell wall

Karnataka CET-2002

Ans. (a) : The chloroplast present in both, guard cells and mesophyll cells. When environmental conditions change, guard cells can rapidly change shape so that the pores open or close to control leaf gas exchange and water transpiration.
Mesophyll cells are parenchyma cells between the upper and lower epidermis specialized for photosynthesis.

271. Which of the following does not have stomata?
(a) Hydrophytes
(b) Mesophytes
(c) Xerophytes
(d) Submerged hydrophytes

AFMC-2002

Ans. (d) : Submerged plants (e.g. Hydrilla, vallisneria, potamogeton do not have stomata, and they are dependent on epidermal cells to absorb all nutrients and gases that dissolved in water. In hydrophytes exchange of gases takes place directly by the plant body cells.
• Such plants do not need stoma for this purpose. Hence underwater plants do not have stomata.

272. Which combination of tissues acts together to provide the support to the hypocotyl of a seedling?
(a) Epidermis and collenchyma
(b) Xylem and parenchyma
(c) Epidermis and parenchyma
(d) Xylem and phloem fibres

HP CET-2011

Ans. (a) : The hypocotyl refers to the Germinating seeding stem which is normally found underneath the seed leaves but above the roots. The hypocotyl grows in response to light stimulation and gradually develops into the stem. Mechanical strength to hypocotyls of seeding is provided by epidermis and collenchymas tissues.

273. The sclerenchyma of the hypodermis in the Pinus needle helps in:
(a) increasing the absorptive surface of the cell
(b) checking transpiration
(c) mechanical support
(d) photosynthesis

HP CET-2011

Ans. (c) : Sclerenchyma provides mechanical support in the pinus needle as it has thick walls. Sclerenchyma may be fibres or sclereoid. The epidermis is covered on the outside by a thick cuticle, which helps in checking transpiration. The parenchymatous mesophyll consists of thin walled cell which contain numerous chloroplasts and thus photosynthetic in function.

274. The epidermal hairs present on the stem of the plant is called
(a) trichomes (b) root hairs
(c) stomata (d) guard cells

J&K CET-2014

Ans. (a) : The epidermal hairs present on the stem of the plant is called trichomes. The roots hairs are unicellular, elongated of the epidermal cells and helps to absorb water and minerals from the soil on the stem.

275. Lenticels are involved in
(a) Photosynthesis
(b) Food transport
(c) Conduction of water
(d) Transpiration
(e) Gaseous exchange

Kerala PMT-2015

Ans. (e) : Its function as a pore providing a pathway for the direct exchange of gases. Lenticles are involved in gaseous exchange lenticles is porus tissue consisting of cells with large intercellular space in the periderm of the secondary thickened organs and bark of woody stem of flowering plants.

276. Vascular tissues in flowering plants develop from
(a) phellogen (b) plerome
(c) periblem (d) dermatogens

BHU PMT (Screening)-2010
AIPMT-2008

Ans. (b) : Plerome:- Lies in the centre, it give rise stele including pericycle pith or medulla pith rays or medullary rays and vascular bundle. The part of the plerome from which vascular tissues are fashioned is known as procambium.

277. In respect of many grasses, the presence of motor cells in the upper epidermis of leaves is to
(a) increase the surface area of the leaf
(b) store large amounts of water
(c) check transpiration by reducing the surface area of the leaf
(d) bear unicellular trichomes

AMU-2011

Ans. (c) : Bulliform cells or motor cells are large bubble shaped epidermal cells that occur in groups on the upper surface of the leaves of many grasses.
• The upper epidermis typically has only about half the density of stomata that occur on the lower epidermis, so while transpiration does occur across the upper epidermis, not as much occurs as across the lower.

278. Piliferous layer in the root is
(a) epidermis (b) pericycle
(c) cortex (d) endoderics

AMU-2011

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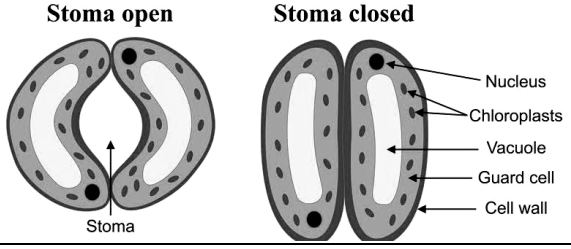
Ans. (a) : Epidermis:- Piliferous layer is the part of the root epidermis, that bears root hairs. It extends over a region about 410 nm behind the root tip. Beyond this the piliferous layer is sloughed to reveal the hypodermis.

279. Stomatal opening or closing is due to

(a) change in the turgidity of guard cells
(b) the inner walls of each guard cells is thick and elastic
(c) cellulose microfibrils of guard cells are oriented radially
(d) All of the above

AMU-2010
JCECE-2006
AIPMT-2002

Ans. (d) : The immediate cause of the opening or closing of stomata is a change in the turgidity of the **guard cells.** The inner wall of each guard cell, towards the pore or **stomatal aperture,** is thick and elastic. When turgidity increases within the two guard cells flanking each stomatal aperture or pore, the thin outer walls bulge out and force the inner walls into a crescent shape. The opening of the stoma is also aided due to the orientation of the microfibrils in the cell walls of the guard cells. Cellulose microfibrils are oriented radically rather than longitudinally making it easier for the stoma to open.



280. Cuticle is

(a) A cellular layer on epidermis, which is visible and found in most organ
(b) A cellular layer on epidermis which is visible or invisible, found in all organs
(c) A cellular layer on epidermis of dead cells
(d) A layer on epidermis which is dead and visible or invisible.

VMMC-2007
UPCPMT-2002
AMU-1998

Ans. (a) : A leaf is covered by on both surface by a single layered epidermis. The outer walls of the epidermis are usually thickened and covered with a waxy substance called citin. The outer surface of the epidermis are frequently covered with a thin or thick cuticle.

281. Northern blotting is used for:

(a) DNA transfer (b) RNA transfer
(c) protein transfer (d) all of these

HP CET-2013

Ans. (b) : A northern blot is a laboratory method used to detect specific RNA molecule among a mixture of RNA Northern blotting can be used to analyze a sample of RNA form a particular issue or cell type in order to measure the RNA expression of particular genes.

282. In soil, water available for plants is:

(a) capillary water
(b) hygrosopic water
(c) gravitational water
(d) chemically bound water

HP CET-2013

Ans. (a) : In soil water available to the plants is capillary water. Capillary water makes up to about 75% of the total water available to plants, it is held in the small pores of the soil. It is readily available to plants for absorption by roots.

283. Which of the following is a part of a epidermal layer?

(a) Guard cell (b) Root hair
(c) Trichomes (d) All of the above

Rajasthan PMT-1998

Ans. (d) : The part of epidermal layer is guard cells, trichomes and root hair. Guard cells surrounded by special modified epidermal cells called subsidiory or accessory cells which protect guard cells.
Trichomes occur on the shoot trichomes either unicellular as *Cannabis Sativa* mostly multicellular which may be unbranched as sunflower.

284. The shapes of stomata in Cynodon dactylon (doob) is :

(a) oval (b) heart shaped
(c) dump-bell shaped (d) none of these

Rajasthan PMT-1998

Ans. (c) : In monocot like doob grass (cynodon dactylon) and maize etc. Guard cells are dumb bell shaped. The guard cells are living and contain chloroplast.

285. The most primitive type of stele is

(a) eustele (b) solentstele
(c) protostele (d) siphonostele

UP CPMT-2001

Ans. (c) : The most protostele is given by jafferey pith is absent. It is following type.
Haplostele:- The central soild pore of xylem is smooth as selaginella crausina.
Actinostele:- That is star shaped surrounded by phloem and pericycle as lycopodium serratum and lycopodium psilotum.

286. In which of the following tissue is the matrix not a product of synthesis of its cells?

(a) Vascular tissue
(b) Osseus tissue
(c) Loose connective tissue
(d) Adipose tissue

Karnataka CET-2003

Ans. (a) : Vascular tissue:- Central column of axis (root and stem) is called stele, which is made of vascular bundle which constitute of vascular tissue system. Loose connective tissue and fibres loosely arranged in a semifluid ground substance that is. e.g. areolar tissue.

287. Ectophloic siphonostele is found in

(a) Adiantum and Cucurbitaceae
(b) Osmunda and Equistem
(c) Marsilea and Botrychium
(d) Dicksonia and Maiden hair fern

AMU-2007

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Ans. (b): Ectopholic siphanostele is found osmunda and equistem.

288. In a plant organ which is covered by periderm and in which the stomata are absent, some gaseous exchange still takes place through :
(a) aerenchyma (b) trichomes
(c) pneumatophores (d) lenticels

Haryana PMT-2004

Ans. (d) : Lenticles : In place of cork cells complementary cells are thin walled, Parenchymatous loosely arranged have large intercellular spaces, due to increase of number of complementary cells, epidermis ruptured lens core is formed called lenticles exchange of gases occur.

289. The sugarcane plant has :
(a) dumb-bell shaped guard cells
(b) pentamerous flowers
(c) reticulate venation
(d) capsular fruits

Haryana PMT-2004

Ans. (a) : The sugarcane has dumb-bell shaped guard cells in their stomata. Reticulate venation capsular fruits and pentamerous flowers are a characterstic feature of dicotyledonus plant.

290. Stele comprises consists
(a) xylem, phloem and pith
(b) endodermis, xylemand phloem
(c) vascular tissue, pericycle and pith
(d) vascular tissue, endodermis and pith

Manipal-2013

Ans. (c) : According to concept hypothesis of stele proposed by van Tieghem, the stele consists of vascular tissue, ground tissue or pith and a pericycle. The primary body of root and stem are anatomically same i.e. consist of central stele surrounded by cortex. The stele was oriented in first vascular plant (pteridophytes) and it consist of vascular tissue pericycle and pith pericycle surrounds the stele on the outer side.

291. Which one is responsible for opening and closing of stomata?
(a) Rise in pH of guard cell causes hydrolysis of starch
(b) Cytokinins and cAMP are requireds
(c) Absicisic acid promotes closure
(d) All of the above

VMMC-2008
AMU-2008

Ans. (d) : The opening and closing of stomata is regulated by the integration of environmental signals and endogenous hormonal stimuli. When there is the rise in pH it causes hydrolysis of starch into sugar which accumulates in guard cell which result in the opening of cell for this mechanism cytokinins and CAMP are required.

• Abscisic acid is the stress hormone which results in the close stomata.

292. The monocotyledonous seed consists of one large and shield shaped cotyledon known as a/an
(a) Coleoptile (b) Scutellum
(c) Aleurone layer (d) Coleorhiza

J&K CET-2015

Ans. (b) : Monocotyledonaus seed has embryos that bases only one large cotyledon called scutellum. Generally, the scutellum is shaped like a shield. Its located laterally towards the side of the embryo axis like dicotyledons the embryo axis of monocotyledons process a shoot tip called the plumule.

293. Stomata open at night and close during day time in:
(a) succulents (b) xerophytes
(c) hydrophytes (d) mesophytes

WB JEE-2007
JIPMER-1995

Ans. (a) : In succulent plants like Cacti and Bryophyllum stomata are open during the night, and closed during the day time. This is an adaptation of cutting transpirational loss of water. CAM plants are the succulent plant which grow in deserts and are exposed to high temperature of the stomata are open during the night for carbon dioxide uptake but closed during the day to prevent water loss.

294. Consider the following statements
(1) Copper is present in cytochrome oxidase
(2) Pantothenic acid is the precursor of Coenzyme-A
(3) Thiamine pyrophosphate is the prosthetic group in decarboxylases
(4) Zinc is present in RNA and DNA polymerases
(a) 1, 2 and 3 are correct.
(b) 1 and 2 are correct.
(c) 2 and 4 are correct.
(d) 1 and 3 are correct.

BHU PMT (Mains)-2008

Ans. (b) : Copper is present in cytochrome oxidase Pantathenic acid is precursor of Coenzyme-A is the correct option.

295. Cork cambium is also called
(a) phellem (b) phellogen
(c) phelloderm (d) none of these

AMU-1997

Ans. (b) : Cork cambium also called phellogen.
Phellum is also called cork cells.
Phelloderm is also called secondary cortex.

296. The division of an individual vascular cambial cell results in the formation of
(a) two xylem mother cells
(b) two phloem mother cells
(c) one xylem and one phloem mother cell
(d) one xylem or one phloem mother cell and one cambium cell.

AMU-1997

Ans. (c) : Vascular cambial cell results in the formation of one xylem and one phloem mother cell.
Cell division by the cambium produces xylem and phloem. As secondary phloem and xylem tissue accumulates it both increases the girth of the stem and forms wood and bark.

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297. Old stem of Combretum has
(a) inter and intra xylary phloem
(b) inter and extra xylary phloem
(c) intra and extra xylary phloem
(d) All of above

AMU-2004
BVP-2003

Ans. (b) : The old stem combretum and entada the cambium shows abnormal behavior by cutting phloem on the inner as well as at certain places for a short period and then resumes normal activity.

298. Velamen of orchids are formed from
(a) phelloderm (b) phellogen
(c) dermatogen (d) cortex

CG PMT-2006

Ans. (c) : Velamen of orchid are formed from dermatogens velamen is spongy multiple epidermis that covers the root of some epiphytic or semi epiphytic plants. Such as orchids and clivia species. Velamen are formed from root dermatogens. The velamen of an orchid is the white or grey covering of aerial roots. It is many layers thick and capable of absorbing atmospheric moisture and nutrients.

299. Which of the following plant shows multiple epidermis?
(a) Croion (b) Allium
(c) Nerium (d) Cucurbita

BHU PMT-2004

Ans. (c) : Plant shows multiple epidermis in Nerium. The epidermis is the outer most layer of the primary plant body, it is made up of elongated compactly arranged cells, which form a continuous layer. Epidermis is usually single layered but in some plants like Nerium and ficus epidermis is multilayered.

300. Atactostele vascular bundles are
(a) Scattered in the ground tissue
(b) Three in number
(c) In form of ring around
(d) Broken vascular bundles

MGIMS Wardha-2011

Ans. (a) : Atactostele is a type of Eustele which has vascular tissue in the stem that exist as scattered bundles, eustele consist of vascular bundles in the form of one or two rings, where as an atactostele contains numerous vascular bundles, which are scattered in ground tissue throughout the stem.

301. Sunken stomata are present in
(a) Mesophyte (b) Xerophyte
(c) Epiphytes (d) All of these

MGIMS Wardha-2011
VMMC-2010
WB JEE-2007

Ans. (b) : Sunken stomata are commonly found in xerophytes. They are plants adopted to grow in desert conditions. Hydrophytes are plants that grow in water mesophytes are terrestrial plants which are adopted to niether a particularly dry not particularly wet environment.

302. Stoma opens, when
(a) guard cells swell due to an increase in their water potential
(b) gaurd cells swell by endosmosis due to influx of hydrogen ions (protons)
(c) guard cells swell by endosmosis due to influx of potassium ions
(d) guard cells swell due to a decrease in their water potential

Manipal-2009

Ans. (d) : When there is light, potassium ions are pumped in which results is lowering of the water potential inside to guard cells. During day time stomata open, the osmotic pressure of the Guard cell become high as comparison to subsidiary cell or surrounding cell. When water inters from low osmotic pressure to high osmotic pressure that is water moves from surrounding cell in to the Guard cell, by endosmosis guard cell become turgid stomata opens.

303. Distinguishing character of closed vascular bundles is
(a) absence of cambium
(b) presence of cambium
(c) presence of xylem and phloem
(d) presence of pith

VMMC-2010

Ans. (a) : A closed vascular bundle means that there is an absence of a cambium they are not capable of forming the secondary xylem and tissue. In monocots the xylem is found within the inner side while the phloem is present outside the xylem and phloem is arranged side by side within the same radius.

304. What happens during vascularisation in plants?
(a) Differentiation of procambium followed by primary phloem and then primary xylem
(b) Differentiation of procambium, xylem and phloem simultaneously
(c) Differentiation of procambium followed immediately by the development of secondary xylem and phloem
(d) Differentiation of procambium followed by the development of xylem and phloem

Haryana PMT-2010

Ans. (d) : Vascular plants grow and develop by the activity of organ forming regions, the growing plant. Development of vascular bundles from Pro- cambium is called as vascularisation. Thin walled elongated procambium strands are produced during the early growth and differenation which is turn immediately diffrenciate in to primary xylem and phloem.

305. Read the following statements choose the correct option.
I. Hydrolysis of starch produce malic acid in guard cells of stomata.
II. Malic acid accumulation results into closure guard cells.
III. Breakdown of malic acid from potassium malate.
IV. This opens the stomata.

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(a) These sequence of events I to IV are formed in CAM plants
(b) These sequence of events are normal mechanism of stomatal apparatus
(c) The events are characteristics of C_3 and C_4 plants
(d) All statements are wrong

VMMC-2015

Ans. (a) : According to this theory starch converted into the phosphoenolpyruvic acid during the day time with the help of enzyme phosphophenolpyruvate and CO_2. phosphoenol pyruvic acid converted in to oxalo acetic acid which converted in to the malic acid. Malic acid dissociate hydroquinone malate inter in to vacuole of guard cell and hydrogen ions outside of the guard cell. Turgor pressure increase guard cell turgid stomata open.

306. The epidermal trichomes helps in
(a) Transpiration and exchange of gases
(b) Protection from desiccation
(c) Protection and reduction of transpiration
(d) exudes water drops their tips

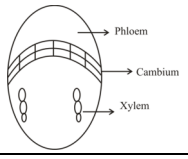
J&K CET-2007

Ans. (c) : The epidermal trichomes help in protection and reduction of transpiration. The epidermal trichome is initiated as a protuberance from an epidermal cell.
• Generally a dense covering of woody trichomes controls the rate of transpiration. They also reduce the heating effect of sunlight.

307. An open collateral bundle is one in which
(a) xylem and phloem are separated by cambium
(b) xylem and phloem lie side by side
(c) cambium occurs on the out side of bundle
(d) cambium does not occur in the bundle

BVP-2014,2012
MGIMS Wardha-2006

Ans. (a) : An open collateral vascular bundle has cambium called fascicular cambium, between xylem and phloem. The bundles can increase in diameter by normal secondary growth with the help of fascicular cambium. So xylem and phloem are separated by cambium.



308. The ground tissue is undifferentiated in:
(a) dicot stem (b) dicot root
(c) monocot stem (d) monocot root

AP EAMCET-2000

Ans. (c) : Ground tissue system:- It consist of thin cell called parenchyma cell having cell defined intercellular spaces among them.
• The tissue extends from below the sclerenchyma (hypodermis) to the center. It is not differentiated in to cortex endodermis pericycle and pith as monocot stem.

309. The extension of pith between the vascular bundles as seen in the transverse section of a young dicot stem is called:
(a) Phloem (b) Medullary ray
(c) Cambium (d) Xylem

AP EAMCET-2000

Ans. (b) : Primary xylem shifted towards the center and primary phloem towards pheriphery and crushed the portion opposite each protoxylem group form pith or medullary ray.

310. Amphivasal vascular bundle possess:
(a) Xylem around phloem
(b) Phloem around xylem
(c) Phloem on both sides of xylem
(d) Phloem towards centre and xylem towards periphery

Rajasthan PMT-2006

Ans. (a) : Amphivasal vascular bundles are a type of vascular bundle found in some plant species. They are characterized by having both xylem and phloem located toward the periphery of the bundle, with the xylem occupying the inner region and the phloem surrounding it.

311. Protoxylem in Selaginella stem is:
(a) endarch (b) mesarch
(c) exarch (d) monarch

AP EAMCET-1999

Ans. (c) : Protoxylem in selaginella stems is a type of primary xylem tissue that develops early in the growth of the plant. Protoxylem refers to the first formed xylem elements or cells in a developing plant organ, such as a stem. In contrast, exarch protoxylem would be positioned towards the periphery or outer region of the stem.

312. Vascular bundles in monocotylendons are considered closed because
(a) xylem is surrounded all around by phloem
(b) there are no vessels with perforations
(c) a bundle sheath surrounds each bundle
(d) there is no secondary growth

JCECE-2015

Ans. (d) : As we know that Vascular bundles in Monocotylendons are considered as closed because cambium is absent due to this, there is no secondary growth in the thickness.

313. A student collected a hydrophyte with swollen and with a single vascular bundle in the root. The plant which he collected was
(a) Jussiaea (b) Trapa
(c) Ceratophyllum (d) Potamogeton

Manipal-2010

Ans. (b) : Hydrophytes grow in water or very wet places. They may be submerged or partly submerged. The vascular bundles in hydrophytes show greatest reduction.

314. The structure which contain vascular bundle and is modification of stem is
(a) bristles (b) thorn
(c) prickle (d) spine

AFMC-2010

Ans. (b) : The structure which contain vascular bundle and is modification of stem is made up of thorm.
• Thorns are derived from shoot, they can be branched and they can have leaves. They arise from a buds. Thorn have vascular bundle inside.

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315. Identify the correct statement:

(a) The age of the plant can be determined by its height.
(b) Healing of damaged tissue is because of the activity of sclerenchyma cells.
(c) Grafting is difficult in monocot plants as they have scattered vascular bundles.
(d) Because of marked climate variations, plants growing near the sea shore do not produce annual rings.

Karnataka CET-2009

Ans. (c) : Grafting is difficult in monocot stem because ground tissue in monocot stem is not differentiated into cortex and pith also, there is scattered arrangement of vascular bundle.

316. In a vascular bundle, if xylem vessels develop in a centripetal fashion, the xylem is likely to be

(a) Endarch (b) Exarch
(c) Mesarch (d) Centrarch

Karnataka CET-2008

Ans. (b) : In a vascular bundle, if xylem develops in a centripetal fashion, the xylem is likely to be exarch. Exarch xylem is found in both dicot and monocot root systems.

317. Stomatal opening is regulated by

(a) light
(b) temperature
(c) atmospheric humidity
(d) wind

UP CPMT-2005

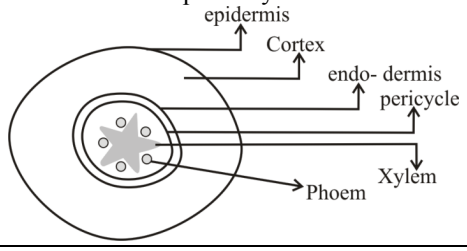
Ans. (a) : Stomatal opeing is primarily regulated by two main factors.
(i) Light intensity
(ii) Concentration of the plant hormone abscisic acid (ABA)

318. Casparian strips are present in

(a) endodermis (b) epidermis
(c) cortex (d) pericycle

UP CPMT-2005

Ans. (a): The casparian strip is named by Robert Caspary. The casparian strip is a water proof tissue. Casparian strips occur in the endodermis. It is a cell wall material that is deposited in the radial and transverse walls of the endodermis of roots. It regulates the water and mineral uptake by the roots.



319. The number of stomata and epidermal cells in 1 mm^2 area of abaxial surface of the leaves of B, C and D plants are given below.

Plant	Number of Stomata	Number of Epidermal cells
A	40	730
B	60	510
C	70	450
D	30	620

Identify the two plants having least stomatal index

(a) B and C (b) A and D
(c) A and C (d) A and B

AP EAMCET-2013

Ans. (b): Stomatal index $= \left(\frac{S}{S+E}\right) \times 100$

Where,
S = No. of stomata per unit area.
E= No. of epidermal cells in the same unit area.
• Stomatal index is the percentage which the number of stomata forms to the total number of epidermal cells, both per unit area of concern. Stomata index can be calculated using the equation.

320. Leptocentric (amphivasal) vascular bundles, (in which the whole phloem is enclosed by xylem) are characteristic feature of

(a) Dracaena and Yucca-Monocot
(b) Dracaena and Cucurbita-Monocot
(c) Ficus and Shorea-Dicot
(d) Xanthium and Acacia-Dicot

UP CPMT-2014

Ans. (a): Leptocentric (amphivasal) vascular bundles is one type of concentric bundles. In that type of bundles xylem tissue surrounds the phloem tissue. It is found in Dracaena, yucca and other monocots and some dicots also. Another type concentric bundle is amphicribal where phloem surrounds xylems and it is found in ferns.

321. Middle lamella is present

(a) inside the secondary wall
(b) inside the primary wall
(c) outside the primary wall
(d) in between secondary and tertiary walls

UP CPMT-2011

Ans. (c): The middle lamella is presents outside the primary wall. Calcium and magnesium pectates form the middle lamella. In a mature plant cell it is the outermost layer of the cell wall. In such case the two adjacent primary wall and the middle lamella perhaps the first layer of the secondary wall of each cell may be called a compound middle lamella.

322. Specialised epidermal cells surrounding the guard cells are called

(a) Lenticels
(b) Complementary cells
(c) Subsidiary cells
(d) Bulliform cells

NEET-2016 Phase-I

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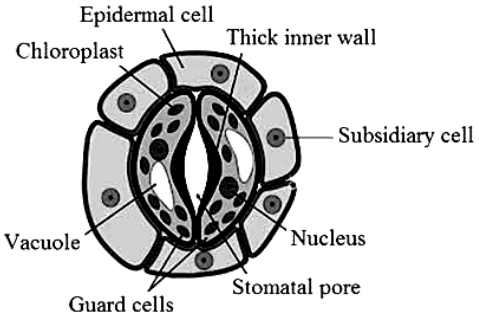
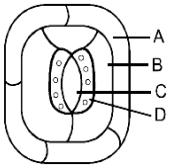
Ans. (c) : Specialized epidermal cells surrounding the guard cells are known as subsidiary or accessory cells. They act as a buffer between guard cells and epidermal cells against guard cells expansion.

Subsidiary cells: As defined subsidiary cells and guard cells, both are the modification and part of epidermal cells in which guard cells have chloroplast which are absent in surrounding subsidiary cells.

STOMA



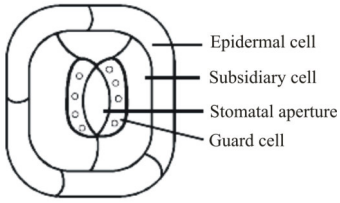
323. Given below is the diagram of a stomatal apparatus. In which of the folloiwng all the four parts Labelled as A, B, C and D are correctly identified



	A	B	C	D
(a)	Epidermal cell	Subsidiary cell	Stomatal aperture	Guard cell
(b)	Subsidiary cell	Epidermal cell	Guard cell	Stomatal aperture
(c)	Guard cell	Stomatal aperture	Subsidiary cell	Epidermal cell
(d)	Epidermal cell	Guard cell	Stomatal aperture	Subsidiary cell

AIPMT (Mains)-2010

Ans. (a) :



The Stomatal apparatus consists of a pair of guard cells with or without surrounding subsidiary cells that serves as a value to open or close a stomatal aperture for gaseous exchange and transpiration. The guard cells are two beans-shaped cells that make up each stoma.

324. Study the following lists

List–I	List–II
(A) Ephemeral	**1. Nerium**
(B) Mucilage	**2. Ziziphus**
(C) Multiple epidermis	**3. Calotropis**
(D) Spine	**4. Tribulus**
	5. Aloe

The correct match is

	A	B	C	D
(a)	2	4	5	1
(b)	5	2	1	4
(c)	4	5	1	2
(d)	4	3	2	1

AP EAMCET-2007

Ans. (c) :

List–I	List–II
(A) Ephemeral	4. Tribulus
(B) Mucilage	5. Aloe
(C) Multiple epidermis	1. Nerium
(D) Spine	2. Ziziphus

325. What happens in plants during vascularisation?

(a) Differentiation of procambium, formation of primary phloem followed by formation of primary xylem

(b) Differentiation of procambium followed by the formation of primary phloem and xylem simultaneously

(c) Formation of procambium, primary phloem and xylem simultaneously

(d) Differentiation of procambium followed by the formation of secondary xylem

AIPMT-2000

Ans. (b) : Vascularization in plants occurs through differentiation of procambium followed by the development of xylem and phloem. All procambial cells appears to differentiate into vascular tissues during primary growth.

326. Closed vascular bundles lack:

(a) Cambium

(b) Pith

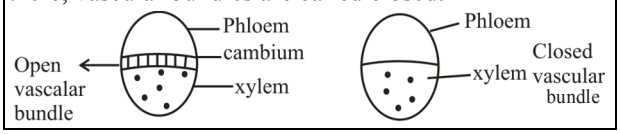
(c) Ground tissue

(d) Conjuctive tissues

AIPMT (Screening)-2012

Ans. (a) :A closed vascular bundle means that there is a absence of cambium they are not capable of forming the secondary xylem and phloem tissue.

- The cambium is a meristematic tissue found in dicot stem and roots.
- When it is present between xylem and phloem, the vascular bundles are called open and when it is absent there, vascular bundles are called closed.



327. Some vascular bundles are described as open because these

(a) are not surrounded by pericycle

(b) are surrounded by pericycle but no endodermis

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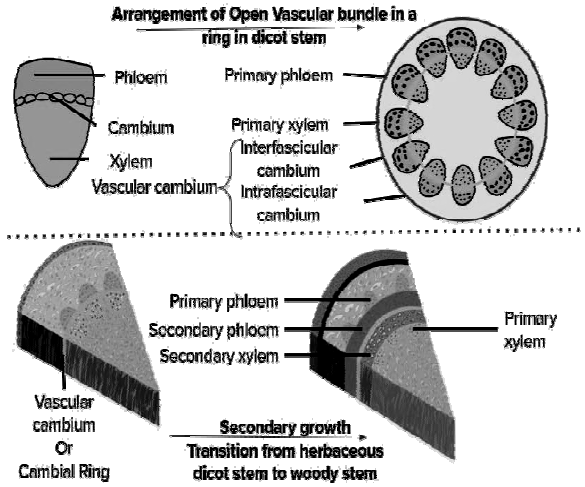
(c) are capable of producing secondary xylem and phloem
(d) possess conjunctive tissue between xylem and phloem

AIPMT (Mains)-2011

Ans. (c) : Open vascular bundles refer to the presence of a strip of cambium in between the xylem and phloem of each vascular bundle. Such types of vascular bundles can be seen in dicotyledonous stems and gymnosperms.

• Cambium is a secondary meristem. Its presence makes the vascular bundle 'open' for secondary growth and, hence, the name.



Conjunctive tissue is found in between the xylem and phloem as patches of parenchymatous cells in dicot roots.

• The pericycle is the layer followed by endodermis. It is made up of both thick-walled parenchymatous cells and sclerenchymatous fibres in a dicot stem.

328. Ground tissue includes:
(a) All tissues internal to endodermis
(b) All tissues external to endodermis
(c) All tissues except epidermis and vascular bundles
(d) Epidermis and cortex

AIPMT (Screening)-2011

Ans. (c) : Ground tissue includes all the tissue except vascular and epidermis bundles.

• Ground tissue consists of three simple tissues:
(1) Parenchyma → Thin walled cells and main function storage of food.
(2) Collenchyma → Thick walled cells and main function supports young plant bodys.
(3) Sclerenchyma → It is composed of two types of cells, sclereids and fibres and main function is provide structural support of the plant body.

329. The number of stomata and epidermal cells in 1mm^2 leaf area of lower epidermis of the leaves of X, Y and Z plants are given below. Arrange the plants in decreasing order of their stomatal index.

Plant	Number of stomata	Number of Epidermal cells
X	30	150
Y	60	240
Z	90	400

The correct answer is
(a) X, Y, Z (b) Y, Z, X
(c) Z, Y, X (d) Y, X, Z

AP EAMCET-2009

Ans. (b) :

Stomatal index (SI) = $\frac{S}{S+E} \times 100$

So, the arrangement of plant in decreasing order of their stomatal index is YZX.

Plant	Number of stomata (S)	Number of epidermal cells (E)	SI
X	30	150	16.6
Y	60	240	20.0
Z	90	400	18.3

330. Vascular bundle in which two patchs of phloem are present on both side of xylem?
(a) Collateral
(b) Bicollateral
(c) Concentric
(d) Radial

UP CPMT-2006

Ans. (b): Bicollateral - Vascular bundle which possess both xylem and phloem are called **conjoint vascular bundle**. In bicollateral conjoint vascular bundles phloem are present on both outer and inner side of xylem **e.g. Cucurbita** solanaceae (the potato family).

331. Raphides are crystals of
(a) calcium carbonate
(b) calcium oxalate
(c) magnesium carbonate
(d) magnesium oxalate

UP CPMT-2006

Ans. (b): Calcium oxalate crystal is present in raphides of almost all the plant organ and is particularly common in storage organs, pith and cortical tissue. The shape of the crystals called raphides are found in aroids **e.g. Colocasia**, Amorphophallus impatieus and many aquatic plant **e.g. Pistia, Eichornia**.

332. A bicollateral vascular bundle has the following arrangement of tissues…….
(a) Outer Phloem – Outer Cambium – Middle Xylem – Inner Cambium – Inner Phloem.
(b) Outer Xylem – Outer Cambium – Middle Phloem– Inner Cambium – Inner Xylem.
(c) Outer Phloem – Outer Xylem– Middle Cambium– Inner Xylem– Inner Phloem.
(d) Outer Cambium– Outer Phloem– Middle Xylem – Inner Phloem– Inner Cambium.

Karnataka CET-2004

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Ans. (a) : Bicollateral - Vascular bundle which possess both xylem and phloem are called **conjoint vascular bundle**. In bicollateral conjoint vascular bundles phloem are present on both outer and inner side of xylem e.g. Cucurbita.

Outer Phloem → Outer Cambium → Middle Xylem → Inner Cambium → Inner Phloem

E. Dicot and Monocot Root

333. Polyarch and tetrarch vascular bundles generally occur in theses

(a) Monocot stem and dicot root.
(b) Dicot stem and monocot stem.
(c) Dicot root and monocot root
(d) Monocot root and dicot root.

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Polyarch vascular bundles are found in monocot roots. The words polyarch' means "many arches" referring to the many xylem strands in each varcular bundle. This is because monocot roots do not have secondary growth. So, they do not need as many xylem strands to transport water and nutrients.

• Tetrarch vascular bundles are found in dicot roots. These are four xylem strands in each vascular bundle.

334. Identify the monocot root characters

I. Polyarch condition
II. Large pith
III. Presence of bundle sheath
IV. Scattered vascular bundles

(a) I and III only
(b) I and II only
(c) II and III only
(d) IV only

TS EAMCET-11.05.2023, Shift-I

Ans. (b) : • Monocot roots have the polyarch condition meaning that they have more than 6 xylem bundles.

• Monocot roots have a central pith made up of parenchyma cells. In monocot roots, the pith is large and spongy. Which helps to store food and water. So, the I and II are character of monocot root.

335. The features are not characteristics of dicotyledonous root

A. Radial vascular bundles.
B. Pith little or absent
C. Vascular bundles 15 – 20
D. Cambium ring do not develop

(a) A, B (b) A, C
(c) C, D (d) B, D

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : <u>Features of dicot root</u>

• Dicot roots have radia vascular bundles, which means that the xylem and phloem are arraged in a circle around the pith.

• The pith is the central region of the root and is made up of soft spongy tissues. In dicot roots the pith is small or absent.

• Dicot roots do not have a combium ring which is a layer of cells that gives rise to secondary growth.

• The features that are not characterstics of dicotyledonous roots are –:

• Vascular bundles 15 – 20 : Dicot roots typlically have 2 – 8 vascular bundles.

• Cambium ring do not develop :

Dicot roots do not have cambium ring . So, the statement (C) & (D) is not the feature of dicotyledomeus noot.

336. The transverse section of a plant part showed polyarch, radial and exarch xylem, with endodermis and pericycle. The plant part is identified as :

(a) Dicot stem (b) Monocot stem
(c) Monocot root (d) Dicot root

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : The monocot root is composed of an endodermis, cortex, endodermis, pericycle xylem, phloem and a pith.

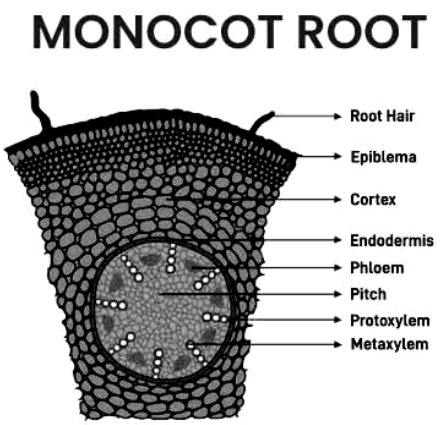
• Monocot root has a pith in the stele it also contain vascular bundles that are composed of both xylem and phloem.

• There are more than four xylem arms called polyarch condition. Monocot roots are usually polyarch.

• Vascular bundle are arranged side by side on different radii and separated by non-conjunctive tissue.

• When protoxylem is outside and metaxylem is inside this arrangement is called exarch.

• Radial vascular bundles are present in roots. Monocot roots have polyarch and exarch condition of xylem.



337. Given below are two statements :

Statement I : Endarch and exarch are the terms often used for describing the position of secondary xylem in the plant body.

Statement II : Exarch condition is the most common feature of the root system.

In the light of the above statements, choose the correct answer from the options given below :

(a) Statement I is incorrect but Statement II is true.
(b) Both Statement I and Statement II are true.
(c) Both Statement I and Statement II are false.
(d) Statement I is correct but Statement II is false.

NEET (UG) 07.05.2023

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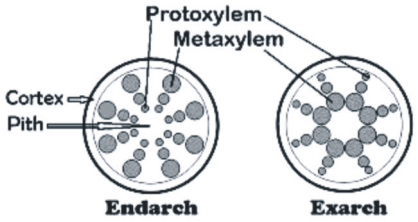
Ans. (a) : The vascular bundle is composed of xylem, phloem and sometimes a layer of cambium.

- Exarch is that arrangement in which the protoxylem is directed towards the periphery and meta xylem towards the center.
- Exarch condition is the characteristic feature of root.
- In endarch condition protoxylem is directed towards the centre and metaxylem towards the periphery Endarch arrangement of vascular bundle is the characteristic feature of stem.



338. What is the role of RNA polymerase III in the process of transcription in Eukaryotes?

(a) Transcription of only snRNAs
(b) Transcription of rRNAs (28S, 18S and 5.8S
(c) Transcription of tRNA, 5 srRNA and snRNA
(d) Transcription of precursor of mRNA

NEET (UG) 07.05.2023

Ans. (c) : In eukaryote cells, RNA polymerase III is a protein that transcribes DNA to synthesize ribosomal 5s rRNA, tRNA and other small RNAs.

- The DNA polymerases are involved mostly in DNA repair and translation DNA synthesis.
- The main function of the third polymerase III is the duplication of the chromosomal DNA.

339. Which one of the following plants does not show plasticity?

(a) Maize (b) Cotton
(c) Coriander (d) Buttercup

NEET-2022

Ans. (a) : The ability of an organism to change its phenotype in response to different environment called plasticity.

- **Maize** is monocot plant (Poaceae) in which hypodermis is sclerenchymatous so maize (zea mays) does not show plasticity.

340. In the dicot root the vascular cambium originates from :

(a) Intrafascicular and interfascicular tissue in a ring
(b) Tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem.
(c) Cortical region
(d) Parenchyma between endodermis and pericycle

NEET (Odisha)-2019

Ans. (b) : In dicot root, the vascular cambium is completely secondary in origin. It originates from. Tissue located below the phloem bundles and a portion of pericycle tissue above protoxylem forming a complete and continuous wavy ring which later become circular.

- The parenchyma cells present between xylem and phloem elements in the vascular bundles constitute 'conjunctive tissue' similarly, the cells of pericycle present against protoxylem divide and form multiple layers of cells, which are joined by cambiam cells derived from conjunctive tissues and together they make a complete cambium ring.

341. Conjunctive tissue is present between (i) and (ii) in (iii)

(a) (i) Pericycle (ii) Endodermis (iii) Dicot root
(b) (i) Xylem (ii) Phloem (iii) Dicot root
(c) (i) Palisade parenchyma (ii) Spongy parenchyma (iii) Dicot leaf
(d) (i) Xylem (ii) Phloem (iii) Dicot stem

Karnataka CET-2018

Ans. (b) : Conjunctive tissue is present between xylem, Phloem and dicot root. Parenchyma cells present in the middle of xylem and phloem which helps in transfer of water and food respectively is called conjunctive tissue.

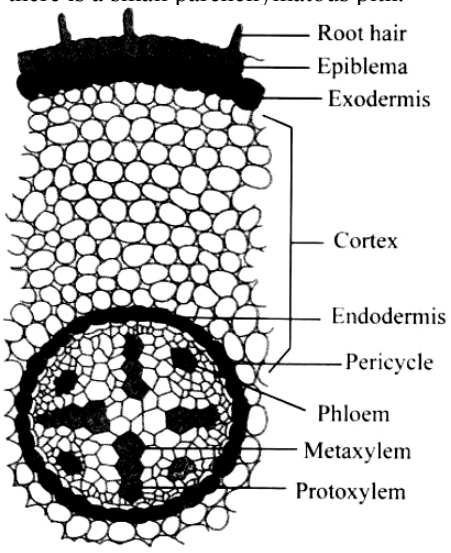
- It does not become meristematic at any formative stage in monocot. In the dicot plants like Boerhavia the conjunctive tissue is condensed in the interfascicular locale and it becomes meristematic and brings to secondary tissue development.

342. Four radial vascular bundle are found in : -

(a) Dicot root (b) Monocot root
(c) Dicot stem (d) Monocot stem

Rajasthan PMT-2007
AIPMT-2002

Ans. (a) : The characteristic features of vascular tissue of the root (dicot) is vascular bundles arranged in radial form, means one xylem and one phloem alternate forms. There are 2 to 6 vascular bundles in the dicot root in center, there is a small parenchymatous pith.



T. S. of Dicot root

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343. A major characteristic of the monocot root is the presence of:

(a) Scattered vascular bundles
(b) Vasculature without cambium
(c) Cambium sandwiched between phloem and xylem along the radius
(d) Open vascular bundles

AIPMT-2015

Ans. (b) : One of the most prominent characteristics of the monocot root is the absence of cambium, this limits the roots ability to grow sufficiently. The monocot root consists of a distinct pith around which the vascular bundles arrange themselves alternately radially forming a ring. They do not take part in cambium formation and are separated by narrow strips known as the **conjunctive tissue**→ Based on the particulars provided one can conclude that the major characteristic of the monocot root is the presence of vasculature without cambium.

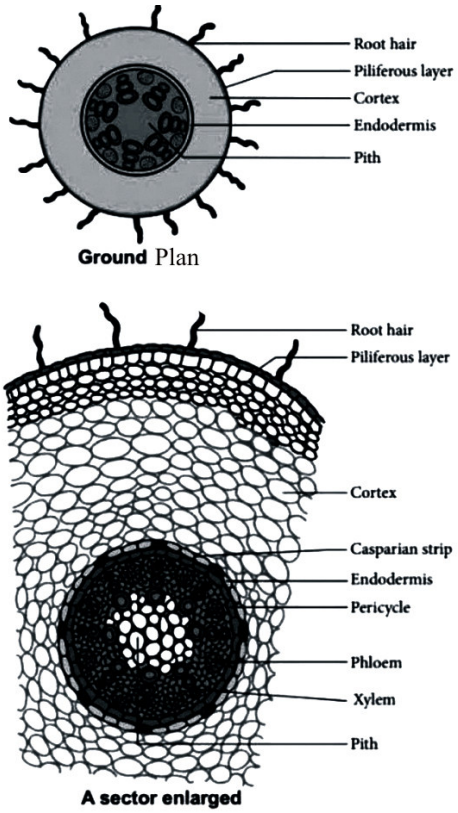


Figure 12.3 Transverse section of Monocot root

344. As compared to a dicot root, a monocot root has

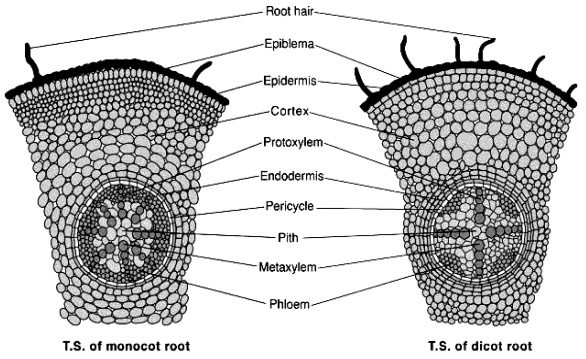
(a) Inconspicuous annual rings
(b) Relatively thicker periderm
(c) More abundant secondary xylem
(d) Many xylem bundles

AIPMT (Mains)-2012

Ans. (d) : In dicot roots, the vascular structure are located in the middle of the roots, the arrangment of xylem and phloem is different in dicots, that it is in monocots the xylem is all located in the middle of dicot root and bundles of phloem are arranged around it by vascular combium.

- In center of monocot root consist of xylem and phloem (vascular strand) and it surrounded by the cortex. Vascular strand is in the form of several alternate and radial xylem and phloem bundles.

Monocot Root vs Dicot Root

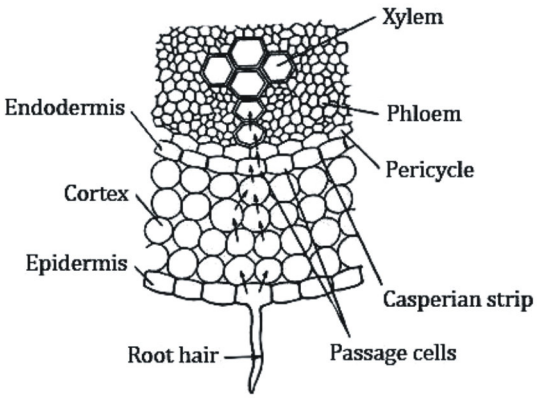


345. Passage cells are found in

(a) Dicot stem (b) Monocot root
(c) Aerial root (d) Monocot stem.

AIIMS-2002

Ans. (b) : Passage cells are endodermal cells of older roots which have retained thin walls and casparian strips rather than becoming suberized and waterproof like the other cells around them, to continue to allow some symplastic flow to the inside. Passage cells function to allow transfer of solutes, such as calcium and magnesium into the steel, in order to eventually reach the transpiration system.



346. Epidermis is specialized for

(a) respiration (b) absorption
(c) protection (d) All of these

Haryana PMT-2011

Ans. (d) : Epidermis is specialized for respiration, absorption and protection also. The plant epidermis is a protective tissue that covers the entire surface of the plant. It regulates the gas exchange in plant cells. The epidermis protects the plant from infection and water loss. It also protects against mechanical injury and parasitic fungus invasion. The epidermis is in charge of absorbing water and essential minerals.

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347. Triradiate vascular bundles can be traced in
(a) monocot roots (b) dicot root
(c) monocots (d) dicot stem

Haryana PMT-2011

Ans. (b) : Dicot root contains radial vascular bundle. In the center, there is a tiny parenchymatous pith. It's also possible that dicot root don't have it. Vascular bundle are in the dicot roots 2-6 in number.

348. In monocot roots which types of vascular bundles are found?
(a) Collateral, conjoint and closed
(b) Radial with exarch xylem
(c) Bicollateral, conjoint and closed
(d) Radial with endarch xylem

BHU PMT-2003

Ans. (b) : The vascular bundles are radial i.e xylem and phloem strands are equal xylem is exarch. The protoxylem poles are found towards periphery and metaxylem towards some centre, the vessels of protoxylem are narrow and possessing granular and spiral thickness.

349. Aerenchyma provides:
(a) flexibility to plants
(b) mechanical strength to plants
(c) buoyancy to hydrophytic plants
(d) promoting nature of photosynthesis

Manipal-2004

Ans. (c) : In hydrophytes there are large spaces in the parenchyma then called parenchyma helps in buoyancy or floating. Parenchyma may be specialized as water storage tissue in may succulent and xerophytic plant in aloe, agave.

350. Select the characters which are not applicable to the anatomy of dicot roots?
(A) Conjunctive tissue present
(B) Presence of protein compounds in the Casparian strips
(C) Polyarch xylem bundles
(D) Presence of pericycle
(a) A and B (b) B and D
(c) C and D (d) A and D
(e) B and C

Kerala PMT-2015

Ans. (e) : Presence of protein compounds in the casparian strips and polyarch xylem bundles not applicable to the anatomy of dicot roots.
• Presence of pericycle and conjunctive tissue are present in the anatomy of dicot roots.

351. In which of the following three radial vascular bundles are present?
(a) Monocot root (b) Dicot root
(c) Monocot stem (d) Dicot stem

Rajasthan PMT-1998

Ans. (b) : The vascular bundles in dicot roots are radial and 2 to 6 strands of xylem and phloem are present in a ring (Diarch to hexarch condition).

352. Assertion (A) : Epidermis in the dicot root is composed of cutinized cells.
Reason (R) : The exodermis in the root offers protection to the inner parts in the absence of epidermis:
The correct answer is:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2004

Ans. (d) : Main function of root is absorption of water It does not bear cutinized cells, the exodermis. In root offers protection to the inner in the absence of epidermis.

353. Casparian strips are characteristic of :
(a) endodermis (b) epidermis
(c) epiblema (d) xylem vessels

Haryana PMT-2004
Manipal-2003

Ans. (a) : The inner most layer of the cortex, called endodermis. It comprises a single layer of barrel shaped cells without any intercellular spaces. The tangential as well as radial wall of the endodermal cell have a deposition of water impermeable waxy material suberin in the form of casparian strips.

Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

354. A monocot root is characterized by vascular bundles that are closed as well as
(a) endarch, collateral and tri-to pentarch
(b) exarch, polyarch and radial
(c) endarch, polyarch and radial
(d) collateral, exarch and polyarch

AMU-1997

Ans. (b) : The vascular bundles are radial, the xylem and phloem strands are equal in number and arranged alternately the bundles are more than six (i.e polyarch condition) the xylem is exarch. The proto xylem poles are found towards pheriphery and meta xylem towards centre. The vessels of proto xylem are narrow and possessing annular and spiral thickness where as the vessels of meta xylem broad and possessing reticulate and pitted thickness or their walls.

355. The vascular bundles of dicot roots are
(a) endarch and polyarch
(b) exarch and polyarch
(c) exarch and radial
(d) endarch and collateral

AMU-1997

Ans. (c) : When xylem and phloem lie an different radaie xylem alternate phloem as roots.
When protoxylem lies towards periphery and metaxylem towards the centre condition is called exarch as root.

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356. When secondary growth in thickness is initiated in a dicot root

(a) pericycle starels outside the primary xylem divide
(b) anticlinal initials between xylem and phloem divide
(c) cambial initials between xylem and phloem divide
(d) parenchyma cells between xylem and phloem become meristematic

VMMC-2015

Ans. (d) : Most of the dicotyledonous roots show secondary in thickness similar to that of dicotyledonous stem. However the monocotyledonous roots do not show any secondary growth. They remain entirely primary throughout their life the secondary tissue developed in the dicotyledonous roots are fundament ally quite similar to that of dicotyledonous stem. But the process initiates in some different manner.

• The dicotyledonous roots posses a limited number of radial vascular bundles with exarch xylem normally the pith is very little or altogether absent.

357. Identify the plant parts whose transverse sections show a clear and prominent pith.

(a) Dicot root and monocot root
(b) Dicot stem and dicot root
(c) Dicot stem and monocot stem
(d) Dicot stem and monocot root

Karnataka CET-2008

Ans. (d) : Dicot stem and monocot roots transverse sections show a clear and prominent pith. Pith is a tissue in the stems of vascular plants. It is made of delicate, springy parenchyma cells. It is made up of thin walled colourless parenchymatous cells with lot of intercellular space.

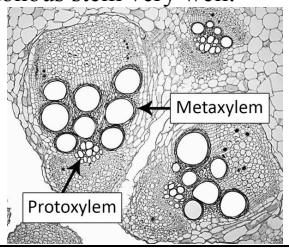
358. Anatomically fairly old dicotyledonous root is distinguished from the dicotyledonous stem by:

(a) Position of protoxylem
(b) absence of secondary xylem
(c) Absence of secondary phloem
(d) Presence of cortex

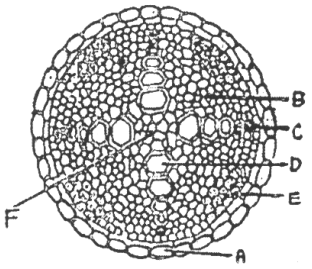
AIPMT-2009

Ans. (a) : Anatomically fairly old dicotyledonous root is distinguished from the dicotyledonous stem by position of cortex. Protoxylem is the first formed xylem developing from procambium and consisting of narrow cells with annular, spiral or scalariform wall thickenings.

Thus, the position of protoxylem and metaxylem can help in distinguishing the fairly old dicotyledonous root from dicotyledonous stem very well.



359. In the diagram of T. S. of Stele of Dicot Root, the different parts have been indicated by alphabets; choose the answer in which these alphabets correctly match with the parts they indicate.



(a) A = Pericycle; B = Conjunctive tissue; C = Metaxylem; D = Protoxylem; E = Phloem; F = Pith.
(b) A = Endodermis; B = Conjunctive tissue; C = Protoxylem; D = Metaxylem; E = Phloem; F = Pith.
(c) A = Endodermis; B = Conjunctive tissue; C = Metaxylem; D = Protoxylem; E = Phloem; F = Pith.
(d) A = Endodermis; B = Pith; C = Protoxylem; D = Metaxylem; E = Phloem; F = Conjunctive tissue.

Karnataka CET-2004

Ans. (b) : All tissue on the inner side of the endo-dermis such as pericycle, vascular bundles and pith constitute the stele image.

360. Fibrous root system is mostly found in:

(a) monocot plants (b) dicot plants
(c) pteridophytes (d) bryophytes

J&K CET-2005

Ans. (a) : Fibrous root system is mostly found in monocot plant. The anatomy of the monocot root is similar to the dicot root. As compared to the dicot root which have xylem bundles, there are usually more than six (Polyarch) xylem bundles in the monocot root. Pith is large and well developed.

F. Dicot and Monocot Stem

361. Lysigenous Cavities are seen in

(a) Monocot roots (b) Dicot roots
(c) Monocot stems (d) Dicot stems

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : Lysiginous cavites are the spaces found by break down of cells inside certain parts of the plant. These space are filled with water air oil.

• Lysogenous cavity are found is hydrophyte in which these are filled with air to provide Buyancy to floating hydro phytes.

• Lysogenious cavity found in monocot stem plant like zea mays.

362. Conjoint, collateral and closed vascular bundles are found in

(a) Monocot root (b) Monocot stem
(c) Dicot root (d) Dicot stem

TS EAMCET 10.05.2023 Shift-I

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Ans. (b) : Conjoint, collateral and closed vasular bundles are found in monocot stem.
The monocot stem has a sclerenchymatous hypodermis, a large number of scattered vascular bundles, each surrounded by a sclerenchymatous bundle sheath, and a large, conspiecious parenchymatous ground tissue. The phloem parenchyma is absent, and water – containing covities are present within the vascular bundles.

363. This type of cells are not present in phloem of a monocot stem
(a) Phloem parenchyma.
(b) Sieve tubes.
(c) Companion cells.
(d) Phloem fibres.

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : Phloem parenchyma cells are not present in phloem of a monocot stem.
• Phloem parenchyma cells providing the structural support to the plants and do not die at their maturity. These cells are found in dicot leaf, dicot stem and monocot root.
• In monocot stem cortex, endoermis, pericycle, pith and phloem parenchyma is absent.

364. Identify the monocot stem characters
I. Exarch xylem
II. Absence of medullary ray
III. Presence of bundle sheath
IV. Scattered vascular mundles
(a) I & II (b) II, III & IV
(c) II & IV (d) I, III & IV

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : The characteristics of monocot stem are as follows–
1. Presence of Bundle Sheath– The vascular bundle is enclosed by a bundle sheath of parenchyma cells in the cortex region.
2. Scattered Vascular Bundles– In monocot stems, the vascular bundles are conjoint and closed type and are scattered throughout the ground tissue.
3. Absence of Medullary Ray– In monocot stem general cortex, endoderm is, pericycle, medullary rays are absent.

365. Match the following

List-I		List-II	
I.	Well developed large pith	A.	Endodermis
II.	Caparian strips	B.	Monocot stem
III.	Scelerenchymatous bundle sheath	C.	Dicot stem
IV.	Endarch protoxylem	D.	Monocot root

(a) I-B, II-A, III-D, IV-C
(b) I-D, II-A, III-B, IV-C
(c) I-D, II-C, III-A, IV-B
(d) I-C, II-A, III-D, IV-B

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : (I) Well developed large pith is found in monocot root. Monocotyledonous roots do not undergo any secondary growth.
(II) Casparian Strips– In dicot root, casparian strips are the ring-like cell wall modifications found in the root of the endodermis of vascular plant.
(III) Scelerenchymatous bundle sheath– The monocot stem has a scelerenchymatous hypodermis, a large number of scattered vascular bundles, each surrounded by a scelerenchymatous bundle sheath.
(IV) Endarch protoxylem– Endarch protoxylem is found in dicot stem. In this type of vascular bundle, protoxylem is present towards the centre and metaxylem is present towards the periphery.

366. The cavities in the vascular bundles of monocot stem
(a) Lysigenous cavities (b) Metaxylem
(c) Large protoxylem (d) Mucilage canal

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : The cavities in the vascular bundles of monocot stem lysigenous cavities. The lysigenous cavity is the secretory depression formed by the decomposition of cells in a tissue.
Metaxylem– Metaxylem exits at the boundary of the structure. It also supports the conduction of water and minerals towards the apical shoot in plants.

367. Arrangement of vascular bundles and bundle sheath tissue in Monocot stem
(a) Ring and Sclerenchyma
(b) Scattered and Sclerenchyma
(c) Scattered and Parenchyma
(d) Scattered and Collenchyma

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : The arrangement of vascular bundles and bundle sheath tissue in Monocot stem scattered and sclerenchyma. On the other hand, in dicots stem, the vascular bundles are arranged in the form of one or two broken circular rings and they have a definite shape.

368. Identify the common character present in both dicot and monocot stems
(a) Pericycle and Endodermis
(b) Open vascular bundles
(c) Well developed large pith
(d) Conjoint vascular bundles

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : The common character present in both dicot and monocot stems conjoint vascular bundles. In the conjoint type of vascular bundles, the xylem and phloem are arranged together in the same radius of vascular bundles.
Open vascular bundles– An open vascular bundles is characterized by the presence of cambial ring between the xylem and phloem bundles.

369. A student observed transverse sections of 2 plant parts under microscope. In that T.S of 'A' has many vascular bundles arranged in a ring, while T.S of 'B' has many scattered vascular bundles. Identify the materials 'A' and 'B' in the same order.
(a) Monocotyledonous root, Dicotyledonous stem
(b) Monocotyledonous stem, Dicotyledonous root

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(c) Monocotyledonous stem, Dicotyledonous stem
(d) Dicotyledonous stem, Monocotyledonous stem

TS EAMCET-30.07.2022 Shift-II

Ans. (d) : A student observed transverse sections of 2 plant parts under microscope. In that
- T.S. of dicotyledonous stem has many vascular bundles arranged in a ring around the pith.
- T.S. of monocotyledonous stem has many scattered vascular bundles near the outside edge of the stem.

370. Arrange the following in a centrifugal manner in Primary Dicot Stem

(I) Pericycle **(II) Cambium**
(III) Metaxylem **(IV) Starch Sheath**

(a) IV, I, II, III
(b) IV, II, I, III
(c) III, II, I, IV
(d) III, I, II, IV

AP EAMCET-11.07.2022 Shift-II

Ans. (c) : Arrange the steps of primary dicot stem – Metaxylem > Cambium > Pericycle > Starch sheath

371. The organic food material is translocated through phloem in the stems of following

(a) Dicot stem with conjoint, Collateral, Closed Vascular bundles
(b) Monocots Stems with vascular bundles
(c) Dicot stems with conjoint, collateral, opened vascular bundles
(d) Dicot stem with bicollateral vascular bundles

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Each of the vascular bundles in the dicot stem is collateral conjoined open and endarch. A cambium is present between xylem and phloem.
- In dicot stem each vascular bundle consists of phloem on the outer side, xylem towards the inner side and a strop of cambium in between the two phloem and xylem tissues lie on the same radius.

372. The characters restricted to monocot Stem & Leaf respectively _____

(a) Trichomes and Bulliform cells
(b) Lysigenous cavity and Bulliform cells
(c) Trichomes and Lysigenous cavity
(d) Bulliform cells and Lysigenous cavity

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Monocots stem possess Lysigenous cavity. These cavities help in storage of water, gases and oil in stem. Like stems of monocots, their leaf also passes water storage bodies, that is spread among the leaf epidermal cells called as Bulliform cells.

373. Assertion (A) : The primary and secondary phloem gradually crushed in the secondary growth of dicot stem.
Reason (R) : The secondary xylem is produced more than secondary phloem.
The correct option among the following is :

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

Ans. (a) : During the activity of the Cambium ring, the Secondary xylem Continues to form and accumulate due to which the primary and Secondary phloem gets crushed.
- During Secondary growth the amount of Secondary Xylem Produced is more than the Secondary phloem because cambium is more active on inner side.

374. The innermost layer of the cortex is called _____

(a) Epidermis (b) Endodermis
(c) Pericycle (d) Hypodermis

AP EAMCET-25.09.2020 Shift-II

Ans. (b) : Endodermis absent in monocot stem woody dicot stem present herbaceous dicot stem. Endodermis well developed in roots. It is the inner most layer of the cortex and outer most to the stele. Single layered cells barreled shaped in stem endodermal cells have starch grains therefore called starch sheath.

375. The transverse section of a plant shows following anatomical features :

(A) Large number of scattered vascular bundles surrounded by bundle sheath
(B) Large conspicuous parenchymatous ground tissue
(C) Vascular bundles conjoint and closed
(D) Phloem parenchyma absent

Identify the category of plant and its part :

(a) Monocotyledonous root
(b) Dicotyledonous stem
(c) Dicotyledonous root
(d) Monocotyledonous stem

NEET-2020 Phase-I

Ans. (d) : Monocotyledonous stem posses large number of scattered vascular bundles surrounded by bundle sheaths. Large conspicuous parenchymatous ground tissue, vascular bundles are conjoint and closed, phloem parenchyma are absent.
- Pholem parenchyma is absent here, because the vascular bundles are open and lack cambium. No secondary growth occurs.

376. Secondary xylem and phloem in dicot stem are produced by

(a) Apical meristems (b) Vascular cambium
(c) Axillary meristems (d) Phellogen

NEET-2018

Ans. (b) : Secondary vascular tissues i.e. secondary xylem and phloem are formed by the vascular cambium.
- Vascular cambium is produced by two types of meristem. Interfascicular and intrafascicular cambium.
- Intrafascicular cambium is a primary meristem which occurs as strips in vascular bundles.
- It divides to form secondary phloem on outerside and secondary xylem on the inner side.

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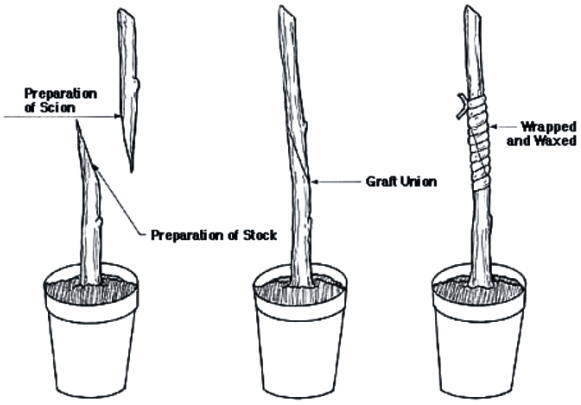
377. Grafting is successful in dicots but not in monocots because the dicots have

(a) Vascular bundles arranged in a ring
(b) Cambium for secondary growth
(c) Vessels with elements arranged end to end
(d) Cork cambium

AIIMS-2006

Ans. (b) : Grafting- Grafting is a type of vegetative reproduction in which a part of plant is inserted into another plant in such a way that their vascular tissue cambium.

- Grafting is successful only in closely related species.
- Main purpose of grafting to obtained desired quality of plants and fruits.
- The cambium possesses that ability to form secondary xylem and phloem.
- It is present in dicots and absent in monocots.
- In case of grafting, it is very important that the plant should form primary and secondary tissue for its survival. Hence, grafting is successful in dicots.



378. Read the different components from (a) to (d) in the list given below and tell the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem

(A) Secondary cortex
(B) Wood
(C) Secondary phloem
(D) Phellem

The correct order is

(a) (D), (C), (A), (B) (b) (C), (D), (B), (A)
(c) (A), (B), (D), (C) (d) (D), (A), (C), (B)

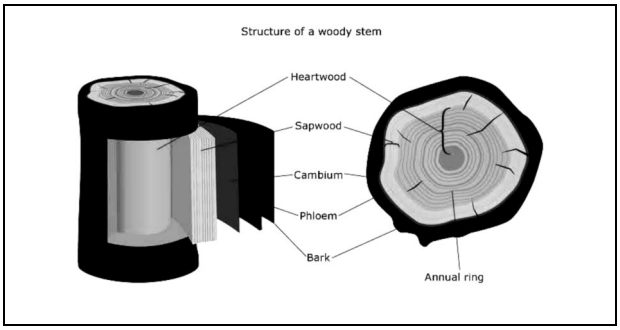
AIPMT (Re-Exam)-2015

Ans. (d) : Sequence of different component from outer side to inner side in woody dicot stem.

Phellem → Secondary cortex → Secondary phloem → wood secondary xylem

outermost — innermost

- In woody dicot stem, phellem (cork) forms the outermost layer followed by phellogen and then secondary phloem forms a narrow circle on the outer side of vascular cambium where as secondary xylem occurs on the inner side of vascular cambium.



379. Maximum numbers of vascular bundles are present in

(a) Monocot stem (b) Monocot root
(c) Dicot stem (d) Dicot root

BCECE-2008
UP CPMT-2006

Ans. (a) : Monocot of stem :- Sclerenchymatous hypodermis is large no. of scattered vascular bundle conjoint and closed.

- The xylem is present in the inner surface and phloem in the outer surface and cambium is not present in monocot plants, hence the vascular bundles in monocot stem are endarch, closed and collateral.

380. Grafting is not possible in monocots because they:

(a) have scattered vascular bundles
(b) are herbaceous
(c) have parallel venation
(d) lack cambium

JIPMER-1995

Ans. (d) : Grafting is not possible in monocots because the lack cambium of tissue, which is present in dicot plants cambium tissue is a meristmatic tissue, which is present in vascular bundle of the dicot plants. The tissue has a regeneration capacity due to which it can form new tissue at time of grafting.

381. Conjoint, collateral and closed vascular bundle is found in :

(a) monocot stem (b) monocot root
(c) dicot stem (d) dicot root

BCECE-2005

Ans. (a) : Conjoint collateral and closed vascular bundle in monocot stem.

Conjoint – The xylem and phloem are arranged together in the same radius of vascular bundle.

Collateral – A vascular bundle in which phloem strand is present outside the xylem strand on the same radius side by side.

- **Closed vascular bundle –** It signifies that cambium is absent.

382. Main function of lenticel is : -

(a) Transpiration
(b) Guttation
(c) Gaseous exchange
(d) Bleeding

AIPMT-2002

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Ans. (c) : The name lenticel is derived from its (lens-like) lenticular form. They facilitate the gas exchange of oxygen, carbon dioxide and water vapour in plant bodies that produce secondary growth.

- Transpiration takes place mostly through stomata.
- Guttation and bleeding takes place through hydathodes.

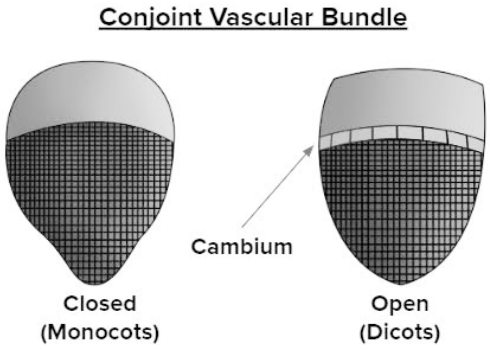
383. Why are vascular bundles closed in monocots?

(a) Xylem and phloem are present
(b) Xylem and phloem occur in separate bundles
(c) Vascular cambium is present between xylem and phloem
(d) Vascular cambium is not present.

AIIMS-2010

Ans. (d) : The xylem and phloem together constitutes vascular bundles.

- In dicotyledonous stems, cambium is present between phloem and xylem is known as open type vascular bundle. Such vascular bundles posses the ability to form secondary xylem and secondary phloem tissues hence are called secondary growth.
- In the monocotyledons the vascular bundle have no cambium present in stem. This type of vascular bundle is called close type and secondary growth is absent.



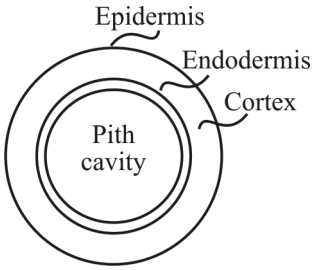
384. Pith cavity occurs in the stem of:

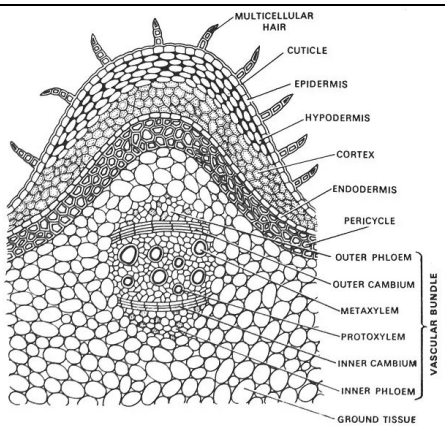
(a) Helianthus (b) Zea mays
(c) Cucurbita (d) Dracaena

AIIMS-2015

Ans. (c) : The central part of stem is a cavity known as pith, in which the vascular bundles are embedded in its outer zone. It is made up of polygonal oval shaped or rounded parenchyma cells which encloses intercellular space.

- The hollow cavity present in the stem is called pith cavity.





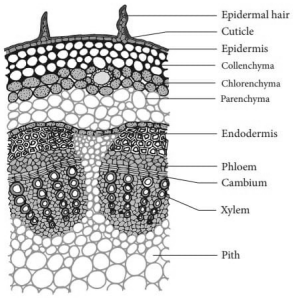
385. From the outside to the inside is:

(a) Phellem – pericycle – endodermis – phloem
(b) Phellem – phloem – endodermis – pericycle
(c) Phellem – endodermis – pericycle – phloem
(d) Pericycle – phellem – endodermis – phloem.

AIIMS-2003

Ans. (c) : The dicotyledonous stem indicates the epidermis which is the ultimate defensive layer. The sequence of tissues from the outside to the inside is phellem-endodermis-pericycle-phloem. Phellem is the cork tissue that replaces the epidermis after secondary growth.

- Endodermis is outer to the pericycle. Xylem and phloem are present and they are interior to pericycle.



386. Pith and cortex do not differentiate in

(a) monocot stem (b) dicot stem
(c) monocot root (d) dicot root.

AIPMT-1988

Ans. (a) : Ground tissue consist of only parenchyma cells that store food. In monocot stem, ground tissue are undifferentiated. Thus endodermis, pericycle cortex and pith are not recognisable.

387. Generally, a monocot stem bears vascular bundles

(a) concentric and closed
(b) concentric and open
(c) conjoint and open
(d) radial and open

BHU PMT-2002

Ans. (a) : When xylem completely surrounds the phloem called concentric vascular bundle. Concentric bundle is always closed.

- When cambium is absent in vascular bundle called the closed vascular bundle as monocot stem.

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388. Grafting is not possible in monocots because they
(a) lack cambium
(b) have scattered vascular bundles
(c) have parallel venation
(d) are herbaceous

MGIMS Wardha-2007
BVP-2012

Ans. (a) : Monocots cannot be grafted as they lack the cambium tissue. The dicot plants have the cambium tissue which is a meristematic tissue and is present in the vascular bundles of the plant.
• The huge chunk of meristematic tissue that can heal the cut wound in the stem is the cambium, which is made up of lateral meristem.

389. Phloem parenchyma is absent in
(a) Monocot stem (b) Dicot stem
(c) Dicot root (d) Dicot leaf

BHU PMT (Screening)-2007
MGIMS Wardha-2008

Ans. (a) : Phloem parenchyma is absent in most of the monocots stem. The majority of the monocot stem is composed of ground tissue, which primarily consists of parenchyma cells.

390. In dicotyledonous stem, which of the following is the sequence of tissues from the outside?
(a) Pith, phloem, cambium, protoxylem, metaxylem, pericycle, parenchyma, collenchyma, endodermis and epidermis
(b) Pith, cambium, phloem, protoxylem, metaxylem, pericycle, endodermis, parenchyma, collenchyma and epidermis
(c) Pith, phloem, protoxylem, metaxylem, cambium, pericycle, endodermis, parenchyma, collenchyma and epidermis
(d) Pith, protoxylem, metaxylem, cambium, phloem, pericycle, endodermis, parenchyma, collenchyma and epidermis

J&K CET-2014

Ans. (d) : In dicotyledonous stem, the pith, protoxylem, metaxylem, cambium, phloem, pericycle, endodermis, parenchyma and epidermis found in outside.

391. If the dicot stem is stained for starch. The most intense colouration would develop in:
(a) epiblema (b) phloem
(c) endodermis (d) pith

VMMC-2006

Ans. (c) : The inner most layer of the cortex is the endodermis. It consisting of barrel shaped elongated compact cells having no inter cellular spaces. It contain starch grain and thus the endodermis may be termed as starch sheath.

392. In dicot stem secondary growth is due to the activity of:
(a) apical meristem (b) lateral meristem
(c) cork (d) bark

Manipal-2000

Ans. (b) : Lateral meristems are seen at the lateral sides of roots and stem in plant. It consists of two meristems called cork cambium and vascular cambium. In a dicot stem, secondary growth occurs due to lateral meristem.

393. The meristem responsible for extra stellar secondary growth in dicot stem is
(a) inter fascicular cambium
(b) intra fascicular cambium
(c) inter calary meristem
(d) phellogen

AMU-2006

Ans. (d) : Phellogen is defined as the meristematic cell layer responsible for the development of the periderm. The extrastelar regions grow simultaneously. The growth of extrastelar region is initiated by the formation of cork cambium of phellogen.

394. In dicot stem, vascular bundles are
(a) Numerous scattered
(b) Arranged in a ring
(c) Without cambium
(d) Surrounded by bundle sheath

CMC Vellore-2010
AMU-2009

Ans. (b) : The vascular bundles of monocotyledonous stem are like those of dicotyledonous stem in consisting of xylem towards the centre of the stele and phloem towards the periphery. The vascular bundles of monocotyledonous stem do not passes a cambium layer. Which found in dicotyledonous stems. Each bundle remains more or less completely surrounded by a sheath of sclerenchyma cells and bundle sheath.

395. Identify the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem.
I. Secondary cortex
II. Autumn wood
III. Secondary phloem
IV. Phellem
(a) II, III, I, IV (b) III, IV, II, I
(c) IV, I, III, II (d) I, II, IV, III

VMMC-2010
AP EAMCET-2005

Ans. (c) : The Correct order from the outer to inner side of the dicot stem is phellum> secondary cortex> secondary phloem> Autumn wood.
• The dicot woody stem is a result of the secondary growth that originates the lateral meristem. The cells of secondary cortex are parenchymatous cells displaced towards, the outside of the vascular cambium differentiate into secondary phloem.

396. Chronological sequence of cellular layers from the periphery towards the cortex in an old dicot stem is
(a) epidermis, hypodermis, cortex, endodermis
(b) epidermis, phellem, phellogen, phelloderm
(c) epidermis, hypodermis, phellogen, phelloderm
(d) epidermis, phellogen, phellem, endodermis

BVP-2013

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Ans. (b) : The transverse section of typical young dicotyledonous stem shows that the epidermis is the outer most protective layer of stem covered with a thin layer of cuticle. It may be bear trichomes and few stomata, the cells arranged in multiple layers between epidermis and pericycle constitute of a few layers of collenchymatous cells. Just below the epidermis which provide mechanical strength to young stem. Cortical layers below hypodermis consist of rounded, then walled parenchymatous cells with consipicuous inter cellular spaces the cells of the endodermis are rich in starch grains.

397. Monocot stem lacks

(a) tracheids (b) sieve tube
(c) cambium (d) none of these

AFMC-2010

Ans. (c) : Commonly the vascular bundles of mono cotyledons do not passes cambium and therefore there is no secondary growth, however it occurs in some monocotyledons e.g. Dracaena and yucca.

398. A monocot stem with secondary growth is

(a) Lilium
(b) Cocos
(c) Yucca
(d) Asparagus

UP CPMT-2011

Ans. (c): Monocots do not undergo secondary growth due to lack of cambium in monocotyledons, secondary growth takes place in some monocotyledons such as yucca.

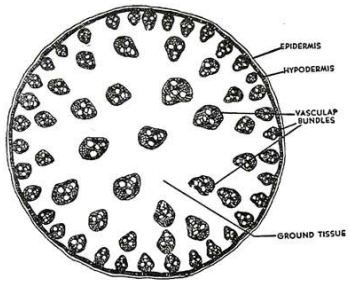
• Secondary growth occurs in most seed plants.

399. In barley stem vascular bundles are -

(a) Closed and radial
(b) Open and scattered
(c) Closed and scattered
(d) Open and in a ring

AIPMT-2009

Ans. (c) : Barley is monocotyledons cereal. Monocot stem has their vascular bundles closed because it lacks vascular cambium and so, no secondary growth is visible in monocot stem.



400. Which one of the following is the correct sequence of tissues present in dicot stem during secondary growth?

(a) Phellogen, cork, primary cortex, secondary cortex
(b) Cork, primary cortex, secondary cortex, phellogen
(c) Primary cortex, secondary cortex, phellogen, cork
(d) Secondary cortex, cork, phellogen, primary cortex

AP EAMCET-2007

Ans. (c) : The correct sequence of tissues present in dicot stem during secondary growth is-
Primary cortex, secondary cortex, phellogen, cork.

401. Water containing cavities in vascular bundles are found in:

(a) Cycas (b) Pinus
(c) Sunflower (d) Maize

AIPMT (Screening)-2012
Rajasthan PMT-2011

Ans. (d) : Water containing cavities in vascular bundles are found in maize. In monocot stem vascular bundles are collateral and conjoint vascular bundles.

• In the vascular bundles, cambium is absent between xylem and phloem. So these are closed vascular bundles.

• In the xylem, protoxylem is towards the centre and metaxylem is towards the periphery. So it is endarch xylem.

• In the protoxylem some of the cells, disintegrate and form into a lysigenous cavity called as protoxylem lacuna eg. maize (lacuna in maize).

G. Dicot and Monocot Leaf

402. Choose the incorrect statement?

(a) Guard cells guards the Stoma
(b) Guard cells are enucleated
(c) Guard cells have uneven cell wall thickening
(d) Guard cell possess chloroplast

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Guard cells, guards the stomata. Guard cells are nucleated. Guard cells have uneven cell wall thickening, unlike other epidermal cells Guard cells possess chloroplasts.

403. Monocot leaves possess

(a) intercalary meristem (b) lateral roots
(c) apical meristem (d) mass meristem

AIPMT-1999

Ans. (a) : Intercalary meristems are derived from apical meristems and separated form the same by permanent cells. They are responsible for localized growth.

404. What is true about a monocot leaf?

(a) Reticulate venation
(b) Absence of bulliform cells epidermis
(c) Mesophyll not differentiated into palisade and spongy tissues
(d) Well differentiated mesophyll

AIPMT-1992, 1990

Ans. (c) : In monocot leaf mesophyll cells are not differentiated into palisade and spongy tissue. But there are well differentiated mesophyll cells in dicot stem. Also in the upper epidermis, there are some large cells found in groups which are called bulliform cells. The venation pattern in monocot is parallel.

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405. The part of the leaf between the upper epidermis and the lower epidermis is called
(a) mid rib (b) hypodermis
(c) mesophyll (d) palisade

JIPMER-1999

Ans. (c) : The leaf tissue that lies between the upper and lower mesophyll and between the veins is usually composed of thin walled parenchyma, called the mesophyll, the tissue that forms the major part of the inner leaf, usually the cells of the mesophyll are two types are –
(i) Palisade parenchyma or palisade tissue
(ii) Spongy parenchyma or spongy tissue

406. In which of the following manner distribution of stomata occur in dorsiventral leaf?
(a) More in palisade tissue and less in spongy parenchyma
(b) Equal in both palisade and spongy parenchyma
(c) More in spongy parenchyma and less in palisade tissue
(d) Absent in all of these

Rajasthan PMT-1998

Ans. (c) : Palisade tissue may consist of one or more layers these cells are arranged near the upper surface of the leaf. Where they receive sunlight and attracted to perform of photosynthesis sometimes the leaves hang vertically so that both leaf surface are equally illuminated the palisade parenchyma of such leaves depends on the intensity of light.
• The lower portion of the mesophyll in the leaf is known as spongy parenchyma or spongy tissue. The spongy tissue is usually composed of loose irregular in walled cells having big inter cellular spaces (airspaces) among them.

407. What differentiates leaf of dicots from monocots ?
(a) Parallel venation
(b) Differentiation of palisade and spongy parenchyma
(c) Stomata only on upper side
(d) Stomata both on upper and lower sides

BHU PMT (Mains)-2008

Ans. (b) :

Dicot leaf	Monocot leaf
(A) Mesophyll is different fitted in to palisade and spongy parenchyma.	(i) Mesophyll not differentiated and all cells are like spongy parenchyma.
(B) Under the palisade mesophyll, spongy mesophyll is located whereas beneath the upper epidermis leaves, palisade mesophyll cells located.	(ii) Sclerenchymatous cells patches are present above and below the large vascular bundles.

408. The cells which help in rolling and unrolling of leaf lamina in grasses are:
(a) complementary cells
(b) motor cells
(c) passage cells
(d) companion cells

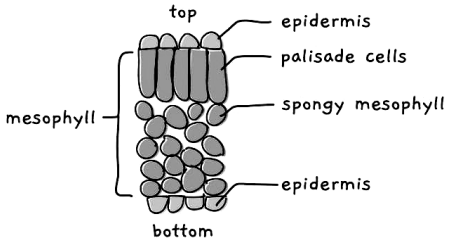
AP EAMCET-2001

Ans. (b) : In grasses certain adaxial epidermal cells along the veins modify themselves in to large empty colorless cells these are called bulliform cells.
• When the bulliform cells in the leaves have absorbed water and are turgid the leaf surface is exposed when they are flaccid due to water stress. The leaves curl in wards to minimize water loss.

409. Palisade parenchyma is absent in leaves of -
(a) Gram (b) Sorghum
(c) Mustard (d) Soybean

AIPMT-2009

Ans. (b) : Monocot mesophyll is not differentiated into palisade and spongy layers. Hence, **sorghum (monocot) does not have palisade parenchyma.** palisade cells occur in dicotyledonous plants and also in the net-veined monocots. They are present in dicots such as gram and soybean.



H. Secondary Growth

410. Duramen is present in
(a) inner region of secondary wood
(b) part of sap wood
(c) outer region of secondary wood
(d) region of pericycle

VMMC-2012
UP CPMT-2012, 2008
BCECE-2010
Uttarakhand PMT-2007

Ans. (a) : Secondary xylem is central axis becomes inert by losing water and storing food content and filled with complex metabolism by products, So this area becomes hard in nature and dark in color, is named as duramen.

411. Consider the following plant tissues:
(A) Axillary buds
(B) Fascicular vascular cambium
(C) Interfascicular cambium
(D) Cork cambium
(E) Intercalary meristem
Identify the lateral meristems among the above.
(a) (A), (B), (C) and (E) only
(b) (A), (B), (D) and (E) only
(c) (A), (C), and (D) only
(d) (B), (C) and (D) only

RE-NEET (UG)-06.06.2023 (Manipur)

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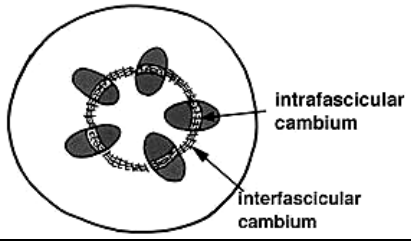
Ans. (d) : Fascicular cambium is present between the xylem and phloem of vascular bundle.

- Inter fascicular cambium present between two vascular bundles.
- Fascicular vascular cambium, inter fascicular cambium and cork cambium are example of lateral meristem.
- The meristem which occurs between mature tissue is known as intercalary meristem.
- Cell of shoot apical meristem form the axillary bud.
- Both intercalary meristem and axillary buds are primary meristem.



412. Identify the correct statements :

A. Lenticels are the lens-shaped openings permitting the exchange of gases.

B. Bark formed early in the season is called hard bark.

C. Bark is a technical term that refers to all tissues exterior to vascular cambium.

D. Bark refers to periderm and secondary phloem.

E. Phellogen is single-layered in thickness.

Choose the correct answer from the options given below :

(a) B and C only (b) B, C and E only

(c) A and D only (d) A, B and D only

NEET (UG) 07.05.2023

Ans. (c) : Lenticels is a porous tissue made up of vast intercellular gaps between cells on stem and root.

- Lenticels allow gases to pass between the atmosphere and the organs interior tissues.
- The bark is the outer covering of the stems and the roots of woody plants especially on tree.
- Bark provides significant support and protection.
- Bark which includes everything towards the outside of the plant starting at vascular Cambium is much thicker than most people assume, the inner bark is composed of living tissue which help translocate the sugar to all parts of plants.

413. Given below are two statements : One is tabelled as Assertion A and the otheris labelled as Reason R :

Assertion A : Latewood has fewer xylary elements withnarrow vessels.

Reason R : Cambium is less active in winters.

In the light of the above statements, choose the correct answer from the options given below :

(a) A is false but R is true.

(b) Both A and R are true

(c) Both A and R are true but R is NOT the correctexplanation of A.

(d) A is true but Ris false.

NEET (UG) 07.05.2023

Ans. (b) : Secondary xylem is called wood.

- The late wood trachieds have somewhat reduced borders with oval inner aperture.
- In temperate regions, every year new wood is formed in a limited growing season, with the result definite growth layers develops, which shows two distinct areas within each layer.
- Those wood which is formed in winter season is called the autumn wood or late wood, and which are formed on summer season called early wood or spring wood.
- There is a sharp contrast between the late autumn wood and the early spring wood and this make the successive ring distinct.
- The cambium cells help in the secondary growth of the plant by providing an undifferentiated mass of cells, the cambial activity is seen between the areas of the xylen and phloem.

414. In old trees the greater part of secondary xylem is dark brown and resistant to insect attack due to :

(A) secretion of secondary metabolities and their deposition in the lumen of vessels

(B) deposition of organic compounds like tannins and resins in the central layers of stem

(C) deposition of suberin and aromatic substances in the outer layer of stem

(D) deposition of tannins, gum, resin and aromatic substances in the peripheral layers of stem

(e) presence of parenchyma cells, functionally active xylem elements and essential oils

Choose the correct answer from the options given below-

(a) (B) and (D) Only

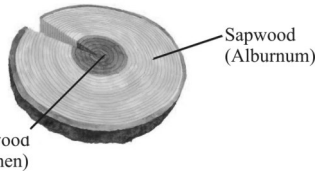
(b) (A) and (B) Only

(c) (C) and (D) Only

(d) (D) and (E) Only

NEET-2022

Ans. (b) : In old trees, the greater part of secondary xylem (wood) is dark brown due to deposition of organic compounds like tannin, resins, oils, gums, aromatic substances and essential oils in the central this type of wood is called **Duramen** or **innermost layers of the stem**, these substance make it hard, durable and resistant to the attacks of micro-organisms and insects. (outer most part of secondary xylem is called **Alburnum**)



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415. Interfascicular cambium is present between:

(a) Primary xylem and primary phloem
(b) Pericycle and endodermis
(c) Two vascular bundles
(d) Secondary xylem and secondary phloem

NEET (Re-Exam)-04.09.2022

Ans. (c) : Interfascicular cambium is the cambium present between two vascular bundles of the stem. When the stem is young, fascicular cambium is found in patches in a single layer between the xylem and the phloem, when the plant grows up these patches Join together to form a complete ring.

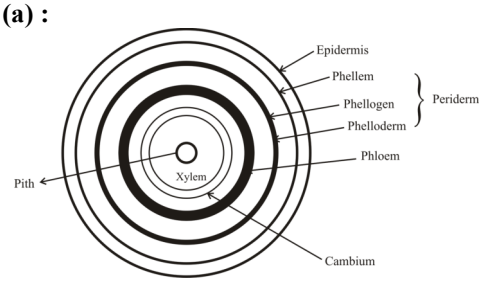
146. Identify the correct statements

(A) Periderm consists of phellem, phellogen, and phelloderm
(B) Permanent tissue having many different types of cells is called complex tissue
(C) In stem, endodermis store starch grains
(D) Heartwood and sapwood produced in a year have same color and density

(a) A, B, C
(b) B, C, D
(c) A, B, D
(d) A, C, D

TS EAMCET-10.08.2021 Shift-I

Ans. (a) :



• Complex permanent tissue having tracheids, vessels, xylem parenchyma and xylem fiber.
• The starch layer is endodermis of dicot stem endodermis, which is rich in starch grains as a food reserve. The periderm consists of three layers, namely the phelloderm, phellogen and phellum.
• Phelloderm and phellogen layer are present in cork cambium, and the phellem layer is present in the cork.
• Heartwood is denser, stronger, and dryer than sapwood. Heartwood has dark color due to the accumulation of many aromatic substances, pigments, and tannis.

417. Match the following lists

	List - I		List - II		List - III
A	Lignified walled dead cells	i	Plants are less active	I	Secondary growth of root
B	During unfavourable seasons	ii	Pericycle above protoxylem	II	Medullary ray
C	Cambium farming narrow band of parenchyma	iii	Does not conduct water	III	Less number of xylem vessels with narrow lumen
D	Cambium forms below phloem	iv	Between secondary xylem and phloem	IV	Heart wood

The correct match is :

Options:

	A	B	C	D
(a)	iii, IV	i, III	ii, II	iv, I
(b)	ii, II	iii, III	iv, I	i, V
(c)	i, IV	ii, III	iv, II	iii, I
(d)	iii, IV	i, III	iv, II	ii, I

TS EAMCET-09.08.2021 Shift-I

Ans. (a & d) : Lignified walled dead cells — Dose not conduct water — Heart wood.
• During unfavorable seasons — plants are less active – – Less number of xylem vessels with narrow lumen.
• Cambium farming narrow band of parenchyma — pericycle above protoxylem — medullary ray
• Cambium form below phloem — Between secondary xylem and phloem —secondary growth of root.

418. Match List-I with List-II.

	List-I		List-II
(A)	Lenticels	(i)	Phellogen
(B)	Cork cambium	(ii)	Suberin deposition
(C)	Secondary cortex	(iii)	Exchange of gases
(D)	Cork	(iv)	Phelloderm

Choose the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(iv)	(ii)	(i)	(iii)
(b)	(iv)	(i)	(iii)	(ii)
(c)	(iii)	(i)	(iv)	(ii)
(d)	(ii)	(iii)	(iv)	(i)

NEET-2021

Ans. (c) : Lenticels - Exchange of gases.
Cork Cambium - Phellogen.
Secondary Cortex - Phelloderm.
Cork - Suberin deposition.

419. Which of the statements given below is not true about formation of Annual Rings in trees?

(a) Differential activity of cambium causes light and dark bands of tissue early and late wood respectively.
(b) Activity of cambium depends upon variation in climate.
(c) Annual rings are not prominent in trees of temperate region.
(d) Annual ring is a combination of spring wood and autumn wood produced in a year

NEET-2019

Ans. (c) : Some plants mainly dicotyledons exhibit an increase in girth this type of mechanism is called secondary growth.
• Annual ring gives an estimate of the age of trees. The cambium ring cut off new sales towards inner and outer sides the activity of cambium is dependent on many psychological and environmental factors.
• In temperate regions climate condition are not uniform throughout the year, however in tropics climatic conditions are uniform throughout the year.

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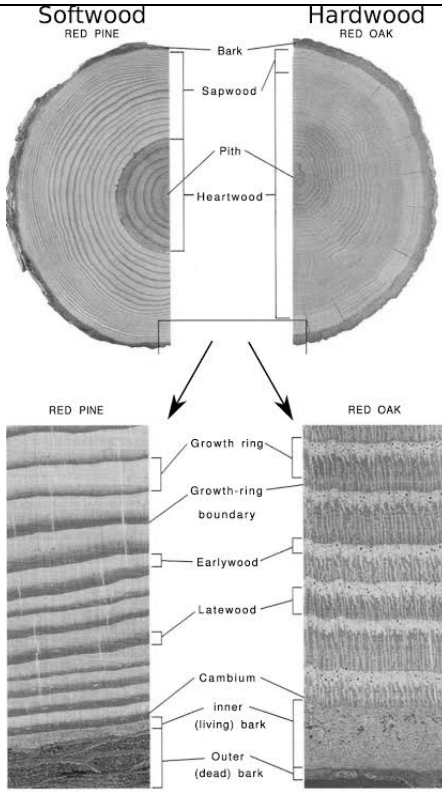


420. Vascular cambium produces:
(a) Primary xylem and primary phloem
(b) Primary xylem and secondary phloem
(c) Secondary xylem and secondary phloem
(d) Secondary xylem and primary phloem

TS EAMCET-09.05.2019 Shift-I

Ans. (c) : The vascular cambium produces secondary xylem on the inside of the ring, and secondary phloem on the outside.

421. The cork cambium, cork and secondary cortex are collectively called:
(a) Phellem (b) Phelloderm
(c) Phellogen (d) periderm

AIPMT (Screening)-2011

Ans. (d) : The cork cambium (phellogen) divide to produce or cut off both sides the outer side differentiate into outer cork (phelllem) and inner side differentiate into secondary cortex (phelloderm).

- Cork is impervious to water due to suberin deposition in the cell wall
- Cork cambium, cork and secondary cortex are collectively called as periderm.

422. In Cycas stem, open vascular bundle is characterized by
(a) phloem being sand witched between xylem
(b) cambium present in between xylem and phloem
(c) xylem being sand witched between phloem
(d) xylem and phloem occurring on different radii

CMC Vellore-2009

Ans. (b) : Secondary growth in stellar region → It is due to activity of cambium. The cambium which is present between xylem and phloem called the intra fascicular cambium. The cambium between the vascular bundle called interfascicular cambium, inter fascicular cambium joined together to form complete cambium ring.

423. Jute fibres are obtained from the
(a) secondary phloem (b) pith
(c) xylem (d) endodermis

JIPMER-2015
DUMET-2009

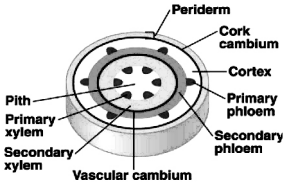
Ans. (a) : Jute fibres mainly compose of the cellulose and lignin. They are under the category of bast fibres which are collected from the skin of the plant or the secondary phloem.

424. Bark refers to?
(a) phellem + phellogen + phelloderm
(b) periderm + cortex
(c) phellem + phelloderm + secondary phloem
(d) periderm + cortex + pericycle + secondary phloem

AIIMS-2009

Ans. (d) : Bark is the outermost layers of stems as well as roots of woody plants. Plants with bark consist of trees woody vines, as well as shrubs. Bark relates to all the tissues outer the vascular cambium as well as it has a nontechnical term. It blankets the wood and contains the main bark along the outer bark. The central bank that is in older stems living tissues comprises the innermost layer of the periderm.

- The external bark on older stems contains the dead tissue on the ground of the stems, along with parts of the extreme periderm as well as all the tissues on the outer side of the periderm. The outer bark on trees that lies outside of the living periderm is also called as **rhytidome**.



425. Cork cambium results in the formation of cork which becomes impermeable to water due to the accumulation of
(a) Resins (b) Suberin
(c) Lignins (d) Tannins.

AIIMS-2004

Ans. (b) : Cork cambium is a secondary lateral meristem that may arises from permanent living cells of hypodermis or outer cortex. It is composed of a single layer of meristematic cells.

- Its cells divide tangentially and periclinally towards the outer surface and produce cork cells. These cells are compactly arranged and have thin cellulose walls in the beginning. As they mature there is a gradual loss of living matter and cells get elongated radially, vertically or tangentially.
- The cell walls become thick because of development of fatty substance called **suberin**, which is impervious to water.

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426. Cork is formed from
(a) cork camblum (phellogen)
(b) vascular cambium
(c) phloem
(d) xylem.

AIPMT-1988

Ans. (a) : Cells of cork cambium phellogen divide the outside as well as inside to from respectively cork or phellem is made up of dead suberised and rectangular cells filled with air and tannis. It is protective in nature.

427. Abnormal/anomalous secondary growth occurs in
(a) Dracaena (b) ginger
(c) wheat (d) sunflower

AIPMT-1993

Ans. (a) : Monocot trees such as palms grow in thickness by primary thickening meristem situated at the base of the leaf plants like Dracaena show secondary growth by a special cambium. It develops in the form of strips just outside the vascular region. This cambium strips produce secondary vascular bundles which is amphivasal in dracaena.

428. Periderm is produced by
(a) vascular cambium
(b) fascicular cambium
(c) phellogen
(d) intrafascicular cambium.

AIPMT-1993

Ans. (c) : Periderm is produced by phellogen.
• Cell of secondary cortex are parenchymatous.
•Phellogen, phellem, and phelloderm are collectively known as periderm.

429. Examples for lateral meristems are
(a) Fascicular cambium and procambium
(b) Procambium and dermatogen
(c) Fascicular cambium and cork cambium
(d) Phellogen and procambium

Karnataka CET-2009

Ans. (c) : Lateral meristems are also called secondary meristems. The vascular cambium produces secondary xylem and phloem. Cork and fascicular cambium help in secondary growth.

430. Secondary cortex is also known as :
(a) Phellem (b) Phelloderm
(c) Phellogen (d) Bark

Karnataka CET-2012

Ans. (b) : Secondary cortex is also known as 'Phelloderm'. Phelloderm is a layer of parenchyma produced by the cork cambium, and inner secondary cortex of the cork cambium. It helps in the storage of food materials and ergastic substances.

431. Which one of the following pairs is an example for lateral meristem?
(a) Interfascicular cambium and phellem
(b) Procambium and phelloderm
(c) Phellogen and fascicular cambium
(d) Phellogen and phelloderm

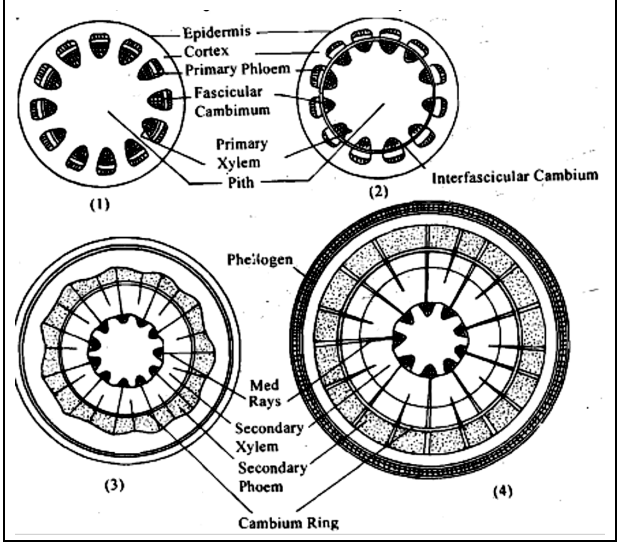
Karnataka CET-2010

Ans. (c) : Fascicular vascular cambium, interfascicular cambium, and cork–cambium (Phellogen) are examples of lateral meristems. These are responsible for producing the secondary tissue.

432. For a critical study of secondary growth in plants, which one of the following pairs is suitable?
(a) Wheat and maiden hair fern
(b) Sugarcane and sunflower
(c) Teak and pine
(d) Deodar and fern

AIPMT-2007

Ans. (c) : Secondary growth is observed in dicots angiosperm and gymnosperm. It is not observed in pteridophytes and is rarely observed in monocots.
• In wheat and sugarcane, there is no secondary growth, and they are monocots.
• Ferns are neither monocots nor dicots because they have no flowers and don't produce seeds.



433. Casparian thickenings are found in the cells of
(a) Pericycle of the root
(b) Endodermis of the root
(c) Pericycle of the stem
(d) Endodermis of the stem

Karnataka CET-2006

Ans. (b) : Casparian thickenings are found in the cells of Endodermis of the root. Endodermis are the innermost layer of cortex, and casparian strips are made up of suberin act as water-impermeable layer. Casparian strips act as a barrier for harmful chemicals, herbicides etc.

434. The following diagrams show the types of secondary thickenings in the xylem vessels. Identify the types labelled from A to F. Choose the correct option from those given.

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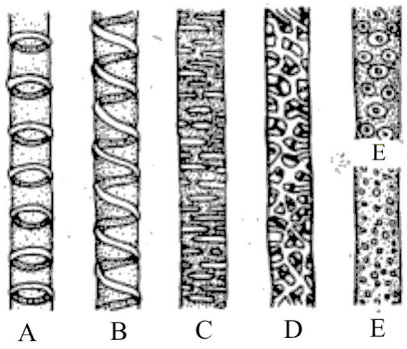
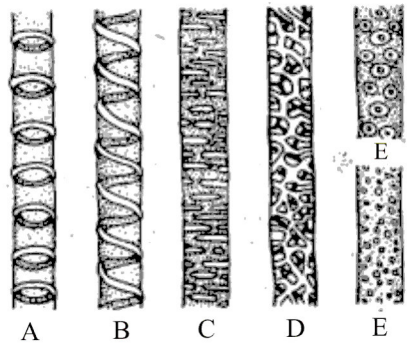


(a) A = Spiral, B = Annular, C = Reticulate, D = Scalariform, E = Pitted with border, F = Pitted, simple
(b) A = Annular, B = Spiral, C = Scalariform, D = Reticulate, E = Pitted with border, F = Pitted, simple
(c) A = Annular, B = Spiral, C = Scalariform, D = Reticulate, E = Pitted, simple F = Pitted with border
(d) A = Spiral, B = Annular, C = Scalariform, D = Reticulate, E = Pitted with border, F = Pitted, simple

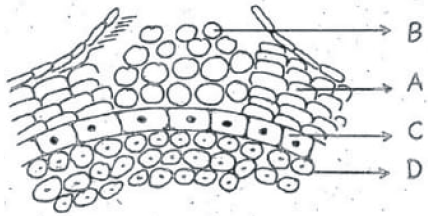
Karnataka CET-2006

Ans. (b) :



A = Annular, B = Spiral, C = Scalariform, D = Reticulate, E = Pitted with border, F = Pitted, simple

435. In the diagram of lenticel, identify the parts as A, B, C, D



(a) A-Complementary cells, B–Phellogen, C–Phelloderm, D–Periderm
(b) A–Complementary cells, B–Phellum, C–Periderm, D–Phelloderm
(c) A–Phellum, B–Periderm, C–Phellogen, D–Phelloderm
(d) A–Phellum, B–Complementary cells, C–Phellogen, D–Phelloderm

Karnataka CET-2007

Ans. (d) : A lenticels is a porous tissue comprising cell with huge intercellular space these can be found in the root of dicotyledonous flowering plant the bark of woody stems. These small opening in the bark enable air to reach the remaining part of the root system.

436. Periderm includes:
(a) Cork cambium only
(b) Cork cambium and cork
(c) Cork and secondary cortex
(d) Cork cambium, cork and secondary cortex

JIPMER-2004

Ans. (d) : The Periderm is the secondary shielding (dermal) tissue that replaces the dermis for the duration of an increase in the thickness of the stems and roots of gymnosperms and dicotyledons. In contrast to the everyday dermis, the periderm is a multilayered tissue machine, maximum of which commonly constitutes the cork, or phylum, the cork cambium or phylogeny, and the phelloderm or secondary cortex. The cork cambium, cork and secondary cortex are together referred to as periderm.

437. The common bottle cork is a product of:
(a) Xylem (b) Vascular Cambium
(c) Dermatogen (d) Phellogen

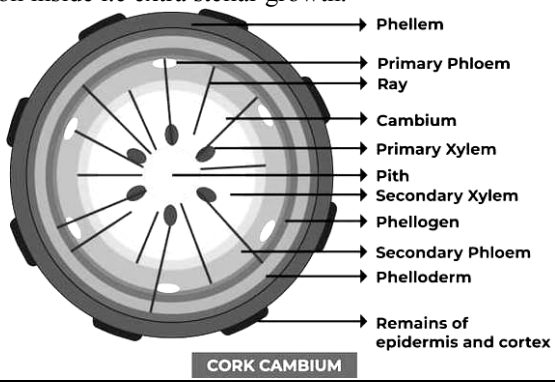
AIPMT (Screening)-2012

Ans. (d) : The common bottle cork is a product of phellogen.
- The common bottle cork produced from Quercus suber.
- Cell of cork cambium divide to produce an outer corky tissue on an inner secondary cortex.

438. Extrastelar secondary growth takes place by :
(a) Vascular cambium (b) Phellogen
(c) Phellem (d) Phelloderm

AIPMT-1998

Ans. (b) : The extrastelar region grow simultaneously. The growth of extrastelar region is initiated by the formation of cork cambium of **phellogen**.
- During secondary growth, rupturing of the epidermal cell and outer cortex by secondary tissues induces the formation of new protective layer, periderm. Pericycle resumes the meristematic activity and divides to form cork cambium/phellogen the cork cambium exhibit meristemetic activity and produces cork/phellem towards the periphery and phelloderm on inside i.e extra stellar growth.



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439. Transition of Exarch bundles of root to Endarch bundles of stem occurs in

(a) Epicotyl (b) Hypocotyl
(c) Apical bud (d) Coleoptile

AIPMT-1999

Ans. (b) : A hypocotyle is a germinating seedling's stem, normally found underneath the seed leaves but above the root.

- The seeding above the transition point has stem structure, which is characterized by the presence of collateral and Endarch vascular bundles and the region of hypocotyl below the transition point is structurally root, which bear radial and Exarch vascular bundles.

440. Which of the following statements related to plants structure are true?

I. The cotyledons of Mauritius have trichosclereids.
II. Young sieve elements possess cytoplasm without nucleus.
III. Cells of pericycle in dicot root are capable of dedifferentiation.
IV. Cork lacks stomata but yet performs gaseous exchange.

(a) I, II (b) II, III
(c) III, IV (d) II, IV

AP EAMCET-2010

Ans. (c) : Sieve elements contain little cytoplasm and no nucleus they combine to form a series of tube containing the leave shoot and root in a fine network food material are transported from one element to another via perforation termed sieve areas or sieve plant, Cork lacks stomata but it is interrupted by lenticels.

I. Spring and Autumn Wood

441. The anatomy of springwood shows some peculiar features. Identify the correct set of statements about springwood.

(A) It is also called as the earlywood
(B) In spring season cambium produces xylem elements with narrow vessels
(C) It is lighter in colour
(D) The springwood along with autumnwood shows alternate concentric rings forming annual rings
(E) It has lower density

Choose the correct answer from the options given below:

(a) (C), (D) and (E) Only
(b) (A), (B), (D) and (E) Only
(c) (A), (C), (D) and (E) Only
(d) (A), (B) and (D) Only

NEET-2022

Ans. (c) : Spring wood is also called **early wood,** it is lighter in color and has a lower density. The vessels are produced with the wider lumens to transport more water to meet the requirement by increased transpiring surface in spring season.

- The spring and autumn wood appears as alternate concentric rings of light and dark color forming annual rings.

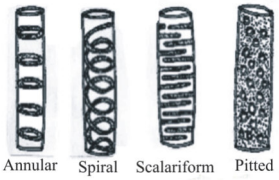
442. Choose the best option that gives the correct match for the terms given in the columns.

Annular	**1**	**Spring**
Scalariform	**2**	**Ring**
Spiral	**3**	**Uniform**
Pitted	**4**	**Ladder**

(a) 4 – 3 – 2 – 1 (b) 2 – 4 – 1 – 3
(c) 2 – 3 – 4 – 1 (d) 3 – 4 – 1 – 2

SRM JEEE -2017

Ans. (b) : (a) Annular thickening:- These are ring Like thickening present on the inner side of primary wall.
(b) Spiral or helical thickening:- These are spiral or Helical thickening of secondary wall materials.
(c) Scalar form thickening:- The Thickening appear as parallel transverse bands like the rungs of a ladder.
(d) Simple pit:- A pit is said to be simple where the secondary wall does not arch over the pit chamber and so the rim of the pit aperture contains no border.

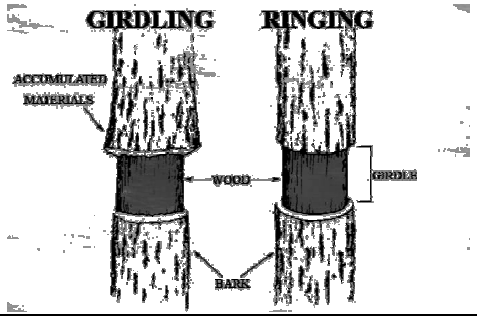


443. In a ring girdled plant :

(a) The root dies first
(b) The shoot and root die together
(c) Neither root nor shoot will die
(d) The shoot dies first

AIPMT-2015

Ans. (a) : In the ring girdled plant, the root dies first. A ring of bark is cut from the stem. It also removes phloem. The phenomenon of ring girdling occurs when the cork cambium and phloem are stripped away, as result nutrition and water movement in the plant stop. The root dies because it is unable to obtain enough sugar to survive.



444. Dendrochronology is the study of

(a) height of a tree
(b) diameter of a tree
(c) age of the tree by counting the number of annual rings in the main stem
(d) None of the above

BVP-2012
UP CPMT-2011, 2004

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Ans. (c) : Study of age of trees by counting the number of annual rings in the main stem is Dendrochronology.
• Each year, the tree forms new cells, arranged in concentric circles called annual rings or annual growth rings.

445. Growth rings are formed due to activity of
(a) extrastelar cambium (b) intrastelar cambium
(c) interstelar cambium (d) Both (b) and (c)

CMC Ludhiana-2012

Ans. (b) : The cambium present between xylem and phloem in vascular bundle is called interafasicular cambium. The intrafasicular cambium joint to interfasicular cambium together called/Inter stellar cambium.
• The winter season activity of cambium loss and produces small sized vessels which are dark colored and loss amount it is called winter wood or autumn wood or late wood. In spring season the activity of cambium are more, it produces large sized narrow vessels large in amount called spring wood or early wood.

446. Annual rings are formed by period activity of
(a) vascular cambium
(b) vascular elements
(c) pericyle and endodermis
(d) Both (a) and (b)

JCECE-2014

Ans. (a) : Annual rings are formed by secondary xylem also called as growth ring. The activity of cambium does not remain same. It is changeable in the whole year. Activity of vascular cambium is affected by physiological and environmental factors.

447. Diffuse porous wood is characteristics of those plants which are growing in: -
(a) Alpine region (b) Cold winter regions
(c) Temperate climate (d) Tropics

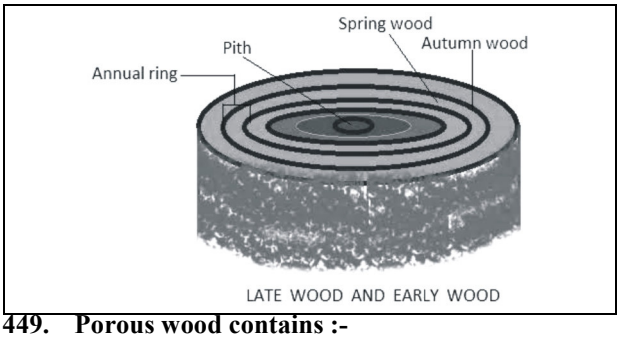
AIPMT-2003

Ans. (d): Diffuse porous wood are most common in trees growing in the regions with tropical climate. In a diffused porous wood, the large sized vessels are distributed through spring wood and autumn wood. Eg. Syzygium cumini.

448. Select the correct pair amongst the following.
(a) Spring wood-light colour, high density
(b) Spring wood-dark colour, low density
(c) Autumn wood-light colour, high density
(d) Autumn wood-dark colour, high density

AIIMS-2013

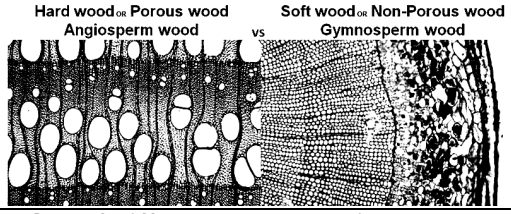
Ans. (d) : Based on the influence of various physiological condition and environmental factors the two types of wood formed are: -
1. **Autumn wood (Late wood) -** The wood formed in the winter season is called **autumn wood**. It is dark color wood with high density. It contains compactly arranged smaller and narrower elements which have comparatively thicker walls. In autumn wood, tracheids and fibers are more abundant than those found in the spring wood.
2. **Spring wood (Early wood) -** The wood formed in spring season is called spring wood. It is light colour wood and with low density. Spring wood consists of larger and wider xylem elements.



449. Porous wood contains :-
(a) Vessels (b) Fibres only
(c) Tracheids (d) Sieve tubes.

AIIMS-2001

Ans. (a) : Vessels are joined end to end to form continuous tubular structures with perforations in their cross walls. Water and minerals are efficiently conducted through these perforations. Vessels are present in most of the angiosperms. Hence, the wood can be termed as porous due to these perforations.
• Porous wood is the dicotyledonous wood that contains abundant vessels. Porous wood can be ring porous or diffuse porous.
• In ring porous wood, vessels are very broad in spring wood and are quite narrow in the autumn wood. Eg. *Dalbergia sisoo, and Cassia fistula*.



450. Out of diffuse porous and ring porous woods, which is correct?
(a) Ring porous wood carries more water for short period.
(b) Diffuse porous wood carries more water.
(c) Ring porous wood carries more water when need is higher.
(d) Diffuse porous wood is less specialized but conducts water rapidly throughout.

AIPMT-1989

Ans. (c) : Ring porous wood carries more water need is higher. Ring porous wood provides better translocation when requirement of plant is more. Hence, it is very advanced than diffuse porous wood.

451. The trees growing in temperature regions show clear demarcation between spring wood and autumn wood. This is because
(a) The water stress is more
(b) The climatic conditions are not uniform throughout the year
(c) The climatic conditions are uniform throughout the year
(d) The temperature is high

Karnataka CET-2019

Ans. (b) : The climatic conditions are not uniform throughout the year.
• It causes to show clear demarcation between spring wood and autumn wood.

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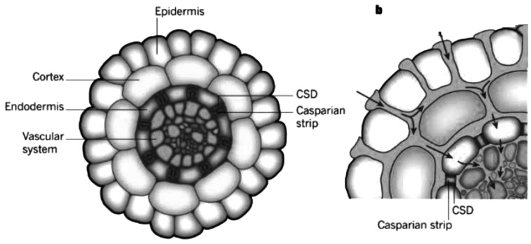
452. Casparian bands are found in

(a) Endodermis (b) Pericycle
(c) Periderm (d) Cortex

AIPMT-1999

Ans. (a) :



Casparian bands are found in 'endodermis.

- Casparian strips are usually present in the endodermis. It is a cell wall material that is present in the radial and transverse walls of the endodermis of roots.

J. Heart and Sap Wood

453. Identify the incorrect statement.

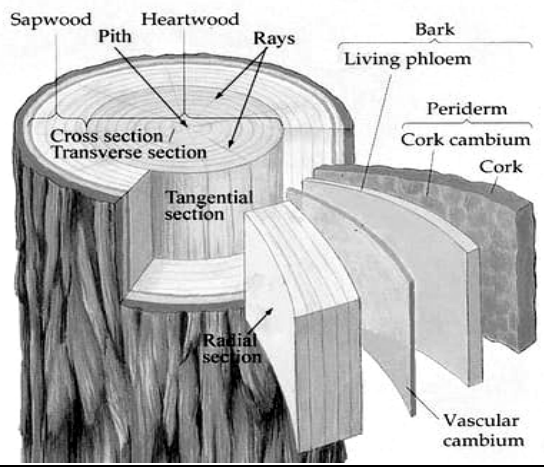
(a) Sapwood is involved in conduction of water and minerals from root to leaf
(b) Sapwood is the innermost secondary xylem and is lighter in colour
(c) Due to deposition of tannins, resins, oils etc., heart wood is dark in colour
(d) Heart wood does not conduct water but gives mechanical support

NEET-2020 Phase-I

Ans. (b) : Sapwood (Alburnum) : Outer living layers of secondary wood of trees, which in transport of H_2O and minerals. Sapwood is the outermost secondary xylem and is lighter in color.

Heart wood (Duramen) : Dead central wood of trees, heart wood is darker in color due to deposition of tannins of other substances.

- Peripheral region of the secondary xylem is lighter in color. This is term as sapwood.
- In the trunk and older branches of large trees, only outer secondary xylem which is sapwood serves in water conduction.
- The inner part which is heartwood is composed of dead but structurally strong xylem.



454. Age of a tree can be estimated by:

(a) diameter of its heartwood
(b) its height and girth
(c) biomass
(d) number of annual rings

NEET-2013

Ans. (d) : Age of tree can be estimated by number of annual rings. The two kinds of woods that appear as alternate concentric ring. Constitute an annual ring heartwood comprises dead element with highly lignified wall that give mechanical support to the stem.

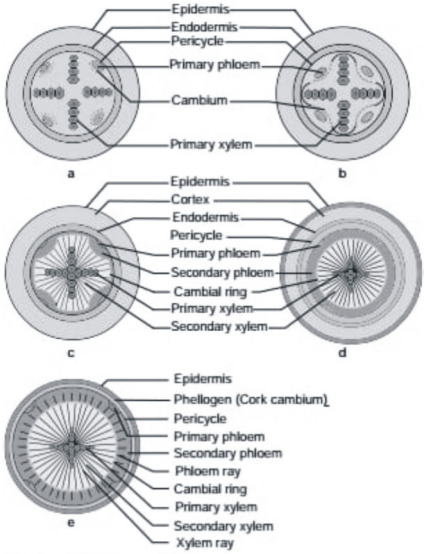
455. A secondary growth proceeds, in a dicot stem, the thickness of

(a) sapwood increases
(b) heartwood increases
(c) both sapwood and heartwood increases
(d) both sapwood and heartwood remains the same.

AIIMS-2016
Karnataka CET-2006

Ans. (b) : Secondary growth occur only dicot plants during the secondary growth the thickness of heartwood increases because of the formation of cambium ring which is found between xylem and phloem. They are responsible for secondary growth.

- Thus, secondary growth is the outward growth of the plants, making it thicker and wider. Secondary growth is important to woody plants, because they grow much taller than the other plants and need more support in their stems and roots.
- Lateral meristem are the dividing cells in secondary growth and are produce secondary tissues.



Different stages of the secondary growth

456. Which exposed wood will decay faster?

(a) Sapwood
(b) Softwood
(c) Wood with lot of fibers
(d) Heartwood

AIPMT-1993

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Ans. (a) : Sapwood decay faster and sapwood is less durable because it is susceptible to attack by pathogen and insects. It is physiologically active and conducting of water takes place through it. Heartwood is not attacked by pathogens and insects as it is physiologically inactive. It is filled with tennis, resins and gums which are not preferred by insects and pathogens.

457. As a tree grows older, which of the following increases more rapidly in thickness?
(a) Heartwood (b) Sapwood
(c) Phloem (d) Cortex

AIPMT-1994

Ans. (a) : In older trees the volume of heartwood increases each year due to the secondary growth.
• Heart wood is also called duramen. It is dead central wood of trees.

458. The inner, darker and harder portion of secondary xylem that can not conduct water, in an older dicot stem, is called ……
(a) Bast (b) Alburnum
(c) Duramen (d) Wood

Karnataka CET-2005

Ans. (c) : The inner, darker and harder portion of secondary xylem that can not conduct water, in an older dicot stem is called duramen.
• The amount of duramen or heartwood rises as the tree grows older while the amount of sapwood almost remains constant.

459. What is/are true about heart wood?
A. It does not help in water conduction
B. It is also called alburnum.
C. It is dark in color but very soft.
D. It has tracheary elements which are filled with tannin, resin etc.
(a) A and D (b) B and D
(c) A, B and C (d) B, C and D

Karnataka CET-2009

Ans. (a) : Heart wood does not help in water conduction.
• Heart wood has tracheary elements which are filled with tannin, resin, etc.

460. Tyloses are found in …….
(a) Secondary xylem
(b) Secondary phloem
(c) Sclerenchyma fibres
(d) Sclereids

Karnataka CET-2010

Ans. (a) : Tyloses are found in secondary xylem. These are common in xylem vessels of many genus of angiosperm including Rhus, Robinia, Morus, Sassafras but they never occurs in many genera. Tylose often block water transport in vessels and cause injury by dehydration.

461. Tyloses an outgrowth from ray or axial parenchyma cell into the lumen of a vessel, which partially or completely blocks the cavity are present in
(a) Periderm (b) heart wood
(c) sap wood (d) secondary cortex

JIPMER-2014

Ans. (b) : In woody plant like heartwood, an extension of parenchymatous cell into the lumen of vessels is observed, this is called as Tyloses. When there is any injury or infection, the cavity is blocked by Tyloses so that no further damage or destruction.

462. Match the following lists.

List I	List II
(A) Tyloses	(i) Coenocytic
(B) Periderm	(ii) Adaxial epidermis
(C) Motor cells	(iii) Complementary cells
(D) Laticifers	(iv) Heart wood
	(v) Conjunctive tissue

The correct match is

	A	B	C	D
(a)	(iii)	(ii)	(i)	(v)
(b)	(ii)	(v)	(i)	(iii)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(iv)	(i)	(iii)	(v)

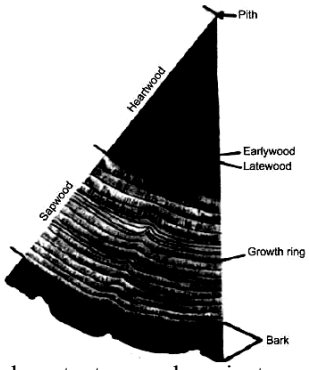
AP EAMCET-2013

Ans. (c):
(a) Tyloses – (iv) Heart wood
(b) Periderm – (iii) Complementary cells
(c) Motor cells – (ii) Adaxial epidermis
(d) Laticifers – (i) Coenocytic

463. Heartwood differs from sapwood in –
(a) Presence of rays and fibres
(b) Abscence of vessels and parenchyma
(c) Having dead and non-conducting elements
(d) Being susceptible to pests and pathogens

AIPMT (Screening)-2010

Ans. (c) : Heartwood **(Duramen)** and sapwood **(Alburnum)** are two distinct forms of wood found in older woody trees. The heartwood is composed of dead xylem vessels that have been filled with Tyloses and are rich in deposits of resins and tannins. These are unusable and are darker. The sapwood contains nearly created functioning vessels that seem lighter.



The heartwood protects wood against pest attack while also increasing its durability.

464. Half life period of C^{14} is : -
(a) 500 years (b) 5000 years
(c) 50 years (d) 5×10^4 year

AIPMT-2001

Ans. (b) : The half-period of C^{14} is 5000 years. It is used in the determination of age of fossils by using technique called carbon dating.
• C^{14} has a half-life of 5,730 ± 40 years- i.e. half the amount of the radio isotope present at any given time will undergo spontaneous disintegration during the succeeding 5,730 years.

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07 STRUCTURAL ORGANIZATION IN ANIMALS

A. Tissue

1. Vagina, oesophagus, urethra contain which type of tissue?
(a) Stratified squamous epithelium
(b) Simple squamous epithelium
(c) Ciliated epithelium
(d) Columnar epithelium

Manipal-2010
AMU-2009
Punjab MET-2008
Uttarakhand PMT-2004

Ans. (a) : Vagina, oesophagus, urethra contain stratified squamous epithelium. It is a type of tissue found covering the lining parts of the body. The major function of this tissue is protection.

2. Thin filament of myofibril is made up of
(a) Actin and Myosin
(b) Actin, Tropomyosin and Troponin
(c) Actin, Tubulin and Troponin
(d) Myosin and Tropomyosin

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : The thin filament of myofibril is made up of actin, tropomyosin and troponin.
• Actin is the main protein in the thin filament. It is a long, thin protein that forms a helix.
• Tropomyosin is a regulatory proteins that binds to actin and blocks the binding site for myosin.
• Troponin is a complex of three proteins that bind to tropomyosin and regulate its movement.

3. Match the following

List – I		List – II	
A.	Chondrocytes	I.	Liver
B.	Dendrites	II.	Muscle
C.	Sarcolemma	III.	Cartilage
D.	Haversian canal	IV.	Nerve cells
		V.	Bone

(a) A – I, B – III, C – IV, D - V
(b) A – III, B – IV, C – II, D - V
(c) A – III, B – IV, C – I, D - V
(d) A – II, B – IV, C – V, D - I

TS EAMCET-11.05.2023, Shift-I

Ans. (b) : The correct match–

Chondrocytes	–	Cartilage
Dendrites	–	Nerve cells
Sarcolemma	–	Muscle
Haversian canal	–	Bone

4. Assertion (A) : Pseudo stratified epithelium gives the false appearance of stratified epithelium
Reason (R) : Pseudo stratified epithelium is made up of more than one layer of cells to provide protection against stress
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true and R is false
(d) A is wrong and R is true

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Assertion is True– Pseudo stratified epithelium is madeup of a single layer of cells, but the nuclei of the cells are arranged in different levels, giving the false appearance of a stratified epithelium.
Reason (R) is False– Pseudo stratified epithelium is not made up of more than one layer of cells, but the nuclei are arranged in different levels.
Therefore, both A and R are true, but R is not the correct explanation of A. So the answer is (c).

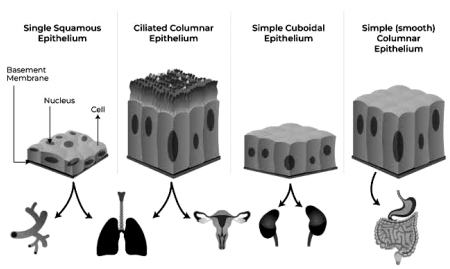
5. Match List-I with List-II.

	List-I		List-II
(A)	Columnar epithelium	(i)	Ducts of glands
(B)	Ciliated epithelium	(ii)	Inner lining of stomach and intestine
(C)	Squamous epithelium	(iii)	Inner lining of bronchioles
(D)	Cuboidal epithelium	(iv)	Endothelium

Choose the correct answer from the options given below :
(a) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(c) (A)-(iii), (B)-(ii), (C)-(i), (D)-(iv)
(d) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Correct option is (b) because,
■ Columnar epithelium is present in inner lining of stomach and intestine.
■ Ciliated epithelium is present in inner lining of blood vessels and is called endothelium.
■ Squamous epithelium present in inner lining of blood vessels and is called endothelium.
■ Cuboidal epithelium is present in the lining of renal tubules and ducts of glands.



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6. Match List I with List II :

	List I		List II
A.	Mast cells	I.	Ciliated epithelium
B.	Inner surface of bronchiole	II.	Areolar connective tissue
C.	Blood	III.	Cuboidal epithelium
D.	Tubular parts of nephron	IV.	Specialised connective tissue

Choose the correct answer from the options given below :

(a) A-III, B-IV, C-II, D-I
(b) A-I, B-II, C-IV, D-III
(c) A-II, B-III, C-J, D-IV
(d) A-II, B-I, C-IV, D-III

NEET (UG) 07.05.2023

Ans. (d) : Mast cell is a type of white blood cell that found in connective tissue and found in throughout the body in loose connective tissue.

• Blood is a specialized body fluid. It transport oxygen from lungs to the tissue etc.

• Epithelial cells which line the inner surface of bronchioles and small bronchi are known as ciliated epithelium.

• Tubular part of nephron consists of a proximal tubule and distal tubule connected by Henle's loop, cuboidal epithelial present in tubular part.

7. Given below are two statements :/ नीचे दो कथन दिये गये हैं :

Stateement I /: Ligaments are dense irregular tissue.

Statement II : Cartilage is dense regular tissue.

In the light of the above statements, choose the correct answer from the options given below :

(a) Statement I is false but Statement II is true.
(b) Both Statement I and Statement II are true.
(c) Both Statement I and Statement II are false.
(d) Statement I is true but Statement II is false.

NEET (UG) 07.05.2023

Ans. (d) : Dense irregular connective tissue comprises structures such as ligaments and tendons.

• They are found in different shapes and sizes in the body. Some look like pieces of string, others look like pieces of string others look like narrow or wide bands.

Cartilage and bones are not examples of dense regular connective tissue. Bone and cartilage are actually a specialized connective tissue.

Hence option (d) is correct answer.

8. The supportive skeletal structures in epiglottis and pubic symphysis of human being are the examples of

(a) Bone (b) Cartilage
(c) Adipose tissue (d) Areolar tissue

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The supportive skeletal structures in epiglottis and pubic symphysis of human being are the examples of cartilage. It forms rubber-like padding to cover and protect long bones at the joints and terminals. It forms the supportive skeletal structures in the human external ears and also at the nose tip.

9. Match the following

List-I		List-II	
A.	**Totipotent cell**	**i.**	**Haemopoietic stem cells**
B.	**Pluripotent cell**	**ii.**	**Muscle stem cells**
C.	**Multipotent cell**	**iii.**	**8 cell stage blastocyst**
D.	**Unipotent cell**	**iv**	**Inner cell mass**
		v	**Mast cell**

The correct match is

Options:

	A	B	C	D
(a)	III	V	IV	II
(b)	III	IV	I	II
(c)	II	III	IV	I
(d)	V	III	II	IV

TS EAMCET-09.08.2021 Shift-I

Ans. (b) :

List-I		List-II	
A.	Totipotent cell	iii.	8 cell stage blastocyst
B.	Pluripotent cell	iv.	Inner cell mass
C.	Multipotent cell	i.	Haemopoietic stem cells
D.	Unipotent cell	ii	Muscle stem cells

10. The branch of "Histology" is also called ____

(a) Anatomy
(b) Micro-Anatomy
(c) Cytology
(d) None of these options are correct

AP EAMCET-25.09.2020 Shift-I

Ans. (b) : The branch of "Histology" is also called micro-Anatomy. It is the microscopic study of animal and plant cell and tissues through staining and sectioning and examining them under a microscope (electron or light microscope)

11. Study the following statements

(A) Compound epithelium forms the lining of the larger pancreatic ducts as stratified cuboidal epithelium

(B) Cartilage is a vascular tissue surrounded by fibrous connective tissue sheath called perichondrium

(C) Gap junctions in cardiac muscles permit electrical impulses to be conducted rapidly

(D) Mylienated nerve fibres are found in grey matter of the central nervous system

Among the above, identify incorrect statements

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Options:

(a) A, B (b) A, C
(c) B, C (d) B, D

AP EAMCET-24.04.2019 Shift-I

Ans. (d) : Perichondrium is the outermost covering of the cartilage. In the matrix of cartilage, blood circulation is absent but it is present in perichondrium. Myelinated nerve fibres are found in white matter of the central nervous system and in most peripheral nerves.

12. The basement membrane acts as

(a) plasma membrane (b) plasmalemma
(c) Both (a) and (b) (d) None of these

CG PMT-2007

Ans. (c) : The basement membrane acts as plasma membrane and plasmalemma. They are a dense, sheet-like form of extracellular matrix (ECM) that underlie epithelium, endothelium, etc. Basement membranes separate tissues and protects them from mechanical stress.

13. The cells of a tissue are similar in

(a) structure (b) function
(c) origin (d) both (b) and (c)

CG PMT-2007

Ans. (d) : The cells of a tissue are similar in function and origin. A group of cells are called as tissue that has a similar origin, structure and function. The same origin means that they are resulting from the same layer of cells in the embryo. Therefore, they have similar structures and perform same functions.

14. Protective structure like nails, hoofs, hairs and horns in mammals are produced in and derivative of

(a) stratum granulosum and epidermis
(b) stratum corneum and epidermal derivatives
(c) stratum malpighi and epidermis
(d) stratum lucidum and epidermal derivatives

BVP-2013

Ans. (b) : Nails, claws, hoofs, hair, horns and feathers all are formed by the outermost layer of the epidermis and stratum corneum. The stratum corneum major function is to protect the skin and underlying tissues from dehydration, chemicals and mechanical stress.

15. Carotene pigment is found in the cells of

(a) dermis (b) epidermis
(c) adipose cell (d) Both (a) and (b)

BVP-2012

Ans. (b) : Carotene pigment is found in the cells of epidermis. It plays a role in providing colour to the skin along with melanin. Carotene is an orange-yellow pigment abundant in carrots and other leafy green vegetables.

16. Velamen tissues are associated with:

(a) haustorial function
(b) assimilation
(c) absorption of moisture
(d) nutrition

BCECE-2002

Ans. (c) : Velamen tissues are associated with absorption of moisture. It is also known as **velamen radicum,** is a porous, multi layered epidermis covering the roots of epiphytic and semi-epiphytic plants. It is capable of absorbing water (in the form of moisture) from the air.

17. Integument is usually called jack of all trades' because:

(a) performs various functions
(b) is most incomplete organ
(c) gives shape to various structures of body
(d) protects the body

Haryana PMT-1999

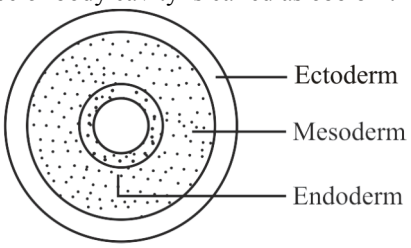
Ans. (a) : Integument is usually called **Jack of all trades** because it performs various functions. It performs many intricate functions such as body temperature regulation, cell fluid maintenance, synthesis of vitamin-D and detection of stimuli.

18. Coelom is a space between

(a) ectoderm and endoderm
(b) mesoderm and ectoderm
(c) splitted mesoderm
(d) mesoderm and body wall

J&K CET-2004

Ans. (c) : In triploblastic animal, a space is created between the body wall and the alimentary canal due to splitting of mesoderm, during embryonic development. This space or body cavity is called as **coelom.**



19. Match the types of animal tissues listed under Column I with the location given under Column II; choose the answer which gives the correct Combination of the alphabets of the two columns:

	Column-I (Tissues)		Column-II (Location)
A	Simple columnar epithelium	p	Wall of heart
B	Cardiac muscle	q	Bone joints
C	Adipose tissue	r	Inner lining of stomach and intestine
D	Hyaline cartilage	s	Below the skin in the abdomen, buttocks, thighs and breasts
		t	Diaphragm

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(a) A = p, B = r, C = s, D = t
(b) A = r, B = p, C = t, D = s
(c) A = r, B = p, C = s, D = q
(d) A = r, B = t, C = q, D = s

Karnataka CET-2000

Ans. (c) :

	Column-I (Tissues)		Column-II (Location)
A	Simple columnar epithelium	r	Inner lining of stomach and intestine
B	Cardiac muscle	p	Wall of heart
C	Adipose tissue	s	Below the skin in the abdomen, buttocks, thighs and breasts
D	Hyaline cartilage	q	Bone joints

20. Stratum germinativum is an example of which kind of epithelium?

(a) Cuboidal (b) Ciliated
(c) Columnar (d) Squamous

Haryana PMT-2000

Ans. (c) : Stratum germinativum is an example of columnar epithelium. It is the most basal layer consisting of columnar epithelium. It is constantly getting germinated, and the new cells push older cells towards the outer layer of the epidermis. It is the deepest layer of the five layers of the epidermis and also the outer covering of skin in mammals.

21. A metazoa without tissue organisation is called :

(a) parazoa (b) protozoa
(c) eumetazoa (d) dermatozoa

Punjab MET-2004

Ans. (a) : A metazoa without tissue organization is called parazoa. It is the subkingdom of animals that lack true tissues and are considered more primitive in their organization.

22. In rabbit, end of a long bone is connected in another by

(a) tendon (b) ligaments
(c) muscle (d) cartilage

VMMC-2012
UP CPMT-2008

Ans. (b) : : In rabbit end of long bone is connected in another by ligaments, which is a fibrous connective tissue usually serves to hold structures together and keep them stable. It connect one bone to other at joints bilateral.

23. The inherent capacity of a cell to regenerate a new whole organisms is called as

(a) ontogeny (b) totipotency
(c) phylogeny (d) proliferation

Punjab MET-2011

Ans. (b) : The inherent capacity of a cell to regenerate a new whole organisms is called as "totipotency" It is the potential to develop and produce differentiated cells in a living body.

24. The ratio of methane, ammonia and hydrogen in Stanley Millers experiment was

(a) 3 : 1 : 2 (b) 2 : 1 : 2
(c) 1 : 2 : 1 (d) 5 : 4 : 1

Rajasthan PMT-2009

Ans. (b) : The ratio of CH_4, NH_3 and H_2 was 2:1:2 in Stanley Miller's experiment. The Miller experiment was helpful in understanding the condition of earth's early atmosphere.

B. Epithelial Tissue and Junctions

25. The ciliated epithelial cells are required to move particles or mucus in a specific direction. In humans, these cells are mainly present in

(a) Fallopian tubes and Pancreatic duct
(b) Eustachian tube and Salivary duct
(c) Bronchioles and Fallopian tubes
(d) Bile duct and Bronchioles

NEET (Re-Exam)-04.09.2022
NEET-2019
Karnataka CET-2017
JCECE-2012
BCECE-2012
AIPMT (Screening)-2011
WB JEE-2011

Ans. (c) : In human cilliated epithelial cells are present in bronchioles and fallopian tubes. In bronchiole they help in movement of mucus while in fallopian tubes, they help in movement of egg or ovum towards the uterus.

26. The lining of intestine and kidneys in humans is :

(a) kcratinized (b) brush border
(c) ciliated (d) none of these

AP EAMCET-2011
Manipal-2008
BVP-2007
MGIMS Wardha-2006

Ans. (b) : The lining of intestine and kidneys in humans is brush border. They are found in the luminal (inner) surfaces of the small intestine and the proximal tubule of the kidney. They are made up of numerous microvilli projecting at the free surface of epithelial lining. The presence of microvilli greatly increase the surface area for absorption. Brush border epithelium, also known as **striated border or brush border.**

27. Bowmans glands are located in the

(a) proximal end of uriniferous tubules
(b) anterior pituitary
(c) female reproductive system of cockroach
(d) olfactory epithelium of our nose

BCECE-2014, 2013
Rajasthan PMT-2010
DUMET-2008

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Ans. (d) : Bowman's glands are located in the olfactory epithelium of our nose. Bowman's glands are also called as olfactory gland. They are situated in the olfactory epithelium. It produces mucus to moister the olfactory epithelium and dissolve odour-containing gases.

28. Ciliated epithelium is present in;

(a) Trachea (b) Ureter
(c) Intestine (d) Nasal chamber

VMMC-2007
Rajasthan PMT-2006, 2005
UP CPMT-2002

Ans. (a) : Ciliated epithelium is present in trachea. It is modified columnar epithelium which have cilia, on free surface, example trachea, uterus, etc.

29. The type of epithelium that is found in proximal convoluted tubule of nephron is

(a) Simple squamous epithelium
(b) Simple cuboidal epithelium
(c) Simple columnar epithelium
(d) Simple glandular epithelium

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : The proximal convulated tubule of nephron is lined with simple cuboidal epithelium. This type of epithelium is made up of a single layer of cells that are cubed-shaped. The cells have a brush border of microvilli, which are tiny projections that increase the surface area of the cells. This allows the cells to absorb more of the nutrients and other substances from the glomerular filtrate.

30. Dense irregular connective tissue occurs in

(a) Umbilical cord
(b) Deeper region of dermis of skin
(c) Vocal cords
(d) Epiglottis

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : Dense irregular connective tissue occurs in deeper region of dermis of skin. The dense irregular fibrous connective tissue can be also found in joint capsules, the connective tissue that envelops muscles (Muscle fascia) and the skin's dermis.

31. Given below are two statements:

Statement I : Goblet cells are unicellular glands.

Statement II : Earwax is the secretion of exocrine gland.

In the light of the above statements, choose the correct answer from the options given below:

(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is true but Statement II is false
(d) Statement I is false but Statement II is true

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : The goblet cells are unicellular because some of the columnar or cuboidal cells get specialized for secretion and are called glandular epithelium. They are responsible for the production and maintenance of the protective mucus.

■ Exocrine glands secrete mucus, saliva, earwax, oil, milk, digestive enzymes and other cell products. It releases chemical substances through ducts to outside the body or onto another surface within the body.

32. Which type of epithelium is present in Vas deferentia ?

(a) Simple Squamous epithelium
(b) Stratified Squamous epithelium
(c) Pseudo Stratified Columnar epithelium
(d) Simple Columnar epithelium

AP EAMCET-11.07.2022 Shift-II

Ans. (c) : Pseudo stratified columnar epithelium present in vas deferentia.

These are tissues farmed by a single layer of cells that give the appearance of being made from multiple layers, especially when seen in cross section.

33. Match the following:

	List-I	**List-II**
A)	**Moist surface of pharynx**	**I) Non ciliated columnar epithelium**
B)	**Larger ducts of salivary glands**	**II) Transitional epithelium**
C)	**Ventricles of Brain**	**III) Stratified cuboidal epithelium**
D)	**Lining of stomach**	**IV) Stratified non keratinised squamous epithelium**
		V) Ciliated columnar epithelium

The correct match is

	A	**B**	**C**	**D**
(a)	IV	III	II	I
(b)	IV	III	V	I
(c)	I	V	III	IV
(d)	V	II	I	IV

TS EAMCET-30.07.2022 Shift-II

Ans. (b) :

List-I		**List-II**	
(A)	Moist surface of pharynx	(IV)	Stratified non-keratinised squamous epithelium
(B)	Larger ducts of salivary glands	(III)	Stratified cuboidal epithelium
(C)	Ventricles of Brain	(V)	Ciliated columnar epithelium
(D)	Lining of stomach	(I)	Non ciliated columnar epithelium.

34. The junction between epithelial cells that prevent the leakage of body fluids

(a) Desmosomes (b) Tight junctions
(c) Gap junctions (d) Synapses

TS EAMCET-31.07.2022 Shift-II

Ans. (b) : The junction between epithelial cells that prevent the leakage of body fluids Tight junctions. Tight junctions form the continuous intercellular barrier between epithelial cells, which is required to separate tissue spaces and regulate selective movement of solutes across the epithelium. Tight junctions create a water tight seal between two adjacent animal cells.

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35. Match the following:

List-I	List-II
(A) Moist surface of pharynx	**(I) Non ciliated columnar epithelium**
(B) Larger ducts of salivary glands	**(II) Transitional epithelium**
(C) Ventricles of Brain	**(III) Stratified cuboidal epithelium**
(D) Lining of stomach	**(IV) Stratified non keratinized squamous epithelium**
	(V) Ciliated columnar epithelium

The correct match is

	A	B	C	D
(a)	IV	III	II	I
(b)	IV	III	V	I
(c)	I	V	III	IV
(d)	V	II	I	IV

TS EAMCET-30.07.2022 Shift-II

Ans. (b) :

	List (A)		List (B)
A.	Moist surface of pharynx	**(iv)**	Stratified non keratinized squamous epithelium
B.	Larger ducts of salivary glands	**(iii)**	Stratified cuboidal epithelium
C.	Ventricles of Brain	**(v)**	Ciliated columnar epithelium
D.	Lining of stomach	**(i)**	Non ciliated columnar epithelium

36. Match List-I with List-II

	List-I		List-II
(A)	**Bronchioles**	**(i)**	**Dense Regular Connective Tissue**
(B)	**Goblet Cell**	**(ii)**	**Loose Connective Tissue**
(C)	**Tendons**	**(iii)**	**Glandular Tissue**
(D)	**Adipose Tissue**	**(iv)**	**Ciliated Epithelium**

Choose the correct answer from the options given below :

(a) (A) - (iii), (B) - (iv), (C) - (ii), (D) - (i)
(b) (A) - (iv), (B) - (iii), (C) - (i), (D) - (ii)
(c) (A) - (i), (B) - (ii), (C) - (iii), (D) - (iv)
(d) (A) - (ii), (B) - (i), (C) - (iv), (D) - (iii)

NEET-2022

	List-I		List-II
(A)	Bronchioles	(iv)	Ciliated Epithelium
(B)	Goblet Cell	(iii)	Glandular Tissue
(C)	Tendons	(i)	Dense Regular Connective Tissue
(D)	Adipose Tissue	(ii)	Loose Connective Tissue

37. Match the following:

Epithelium		Found in
(A) Pavement epithelium	**(i)**	**Germinal epithelium**
(B) Simple cuboidal epithelium	**(ii)**	**Lining of intestine**
(C) Ciliated columnar epithelium	**(iii)**	**Wall of urinary bladder**
(D) Non ciliated columnar epithelium	**(iv)**	**Fallopian tube**
	(v)	**Mesothelium**

The correct match is

	A	B	C	D
(a)	v	iii	ii	iv
(b)	ii	iv	i	v
(c)	v	i	iv	ii
(d)	iii	ii	iv	ii

TS EAMCET-10.08.2021 Shift-I

Ans. (c):

	Epithelium		Found in
(A)	Pavement epithelium	(v)	Mesothelium
(B)	Simple cuboidal epithelium	(i)	Germinal epithelium
(C)	Ciliated columnar epithelium	(iv)	Fallopian tube
(D)	Non ciliated columnar epithelium	(ii)	Lining of intestine

38. Ciliated epithelium is found in

(a) Bronchioles and fallopians tubes
(b) Fallopian tubes and pancreatic duct
(c) Bile duct and fallopians tubes
(d) Salivary duct and eustachian tube

TS EAMCET-29.09.2020 Shift-I

Ans. (a) : Inner surface of bronchi, bronchioles and fallopian tubes is lined by ciliated epithelium. The majority of the respiratory tree, from the nasal cavity to the bronchi, is lined by pseudostratified columnar ciliated epithelium. The bronchioles are lined by simple columnar to the cuboidal epithelium, and the alveoli possess a lining of thin squamous epthielium that allows for gas exchange.

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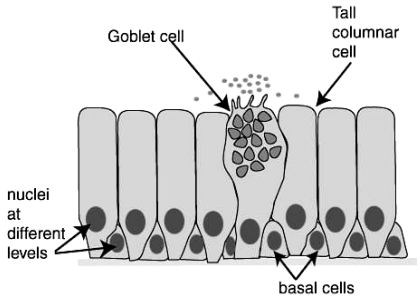
39. Goblet cells of alimentary canal are modified from

(a) Columnar epithelial cells
(b) Chondrocytes
(c) Compound epithelial cells
(d) Squamous epithelial cells

NEET-2020 Phase-I

Ans. (a) : Goblet cells of alimentary canal are modified from columnar epithelial cells.

On the outside of the mucous membranes of organs, goblet cells, modified epithelial cells with a columnar shape, secrete mucus.



- It is found in lower digestive system and the lungs.
- Histologically, they are mucous merocrine exocrine glands.

40. Identify the wrong matching

(A) Goblet cells –Unicellular glands that produce enzymes
(B) Salivary gland – Multi cellular gland
(C) Exocrine glands – secrete mucus, saliva, earwax, oil, milk, digestive enzymes
(D) Tight junctions in epithelium – help to stop substances from leaking across a tissue

(a) A (b) B
(c) C (d) D

AP EAMCET-25.09.2020 Shift-II

Ans. (a) : The Goblet cells are simple columnar epithelial cells that secrete the mucins, like mucin(5AC), which are significant component of mucus.

41. Which of the following epithelium found in the walls of blood vessels and air sacs of lungs and are involved in functions like forming a diffusion boundary ?

(a) Cubiodal epithelium
(b) Columnar epithelium
(c) Squamous epithelium
(d) Ciliated epithelium

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : The type of epithelial cells that is found in the lining of blood vessels and lungs is squamous epithelium. They are extremely thin and flat and form a delicate lining. They are involved in functions like forming a diffusion boundary.

42. Match the following

	Set-I		Set-II
A	Prevent leakages of body fluids between cells	i	Gap Junctions
B	Provide cytoplasmic channels between cells	ii	Ligaments
C	Act as rivets in binding the cells	iii	Tight Junctions
D	Attach bones to other bones	iv	Anchoring Junctions
		v	Tendons

The correct match is

	(A)	(B)	(C)	(D)
(a)	iii	ii	i	v
(b)	ii	iii	i	iv
(c)	iii	i	v	iv
(d)	iii	i	iv	ii

TS EAMCET-09.05.2019 Shift-I

Ans.(d):

	List - I		List-II
(A)	Prevent leakages of body fluids between cells.	(iii)	Tight Junctions
(B)	Provide cytoplasmic channels between cells.	(i)	Gap junctions
(C)	Act as rivets in binding the cells	(iv)	Anchoring junctions
(D)	Attach bones to other bones	(ii)	Ligaments

43. Match the following cell structure with its characteristic feature :

(A) Tight junctions (i) Cement neighbouring cells together to form sheet
(B) Adhering junctions (ii) Transmit information through chemical to another cells
(C) Gap junctions (iii) Establish a barrier to prevent leakage of fluid across epithelial cells
(D) Synaptic junctions (iv) Cytoplasmic channels to facilitate communication between adjacent cells

Select correct option from the following :

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(a) (A)-(iv), (B)-(iii), (C)-(i), (D)-(ii)
(b) (A)-(ii), (B)-(iv), (C)-(i), (D)-(iii)
(c) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)
(d) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)

NEET (Odisha)-2019

Ans. (d):

List - I		List - II	
1.	Tight junctions	(iii)	Establish a barrier to prevent leakage prevent leakage of fluid across epithelial cells
2.	Adhering junctions	(i)	Cement neighbouring cells together to form sheet
3.	Gap junctions	(iv)	Cytoplasmic channels to facilitate communication between adjacent cells
4.	Synaptic junctions	(ii)	Transmit information through chemical to another cells

44. Read the following regarding cellular junctions and specializations
(A) Tight junctions prevent leakages of body fluids.
(B) Keratin filaments anchor desmosomes in inter cellular space.
(C) Communicating junctions comparable to plasma desmata of plant cells.
(D) Stereocilia are short and motile structures seen in internal ear.
Identify the correct statements
Options :
(a) A & B (b) B & C
(c) A & C (d) A & D

AP EAMCET-28.04.2017 Shift-I

Ans. (c) : Tight junctions are also known as **occluding junctions or zonulae occludentes.** They form a watertight closure between two cells, preventing chemicals from flowing through a tissue. The communating junctions between plant cells are called plasmodesmata. They are the only intercellular junctions in plants.

45. The endothelium of blood vessel is composed of
(a) cuboidal epithelium
(b) squamous epithelium
(c) columnar epithelium
(d) ciliated epithelium

Punjab MET-1999

Ans. (b) : The endothelium of blood vessel is composed of squamous epithelium. It is a thin layer of flat cells which forms the interior lining of the blood and lymphatic vessels.

46. The epithelial cells lining the stomach of vertebrates is protected from damage by HCl because
(a) HCl is too dilute
(b) the epithelial cells are resistant to the action of HCl
(c) HCl is neutralised by alkaline gastric juice
(d) the epithelial cells are covered with a mucous secretion

BVP-2010

Ans. (d) : The epithelial cells lining the stomach of vertebrates is protected from damage by HCl because the epithelial cells are covered with a mucous secretion. The mucous covers the stomach wall with a protective coating, together with a bicarbonate, this ensures that the stomach wall itself is not damaged by HCl.

47. Tissue present in skin is
(a) stratified squamous epithelium
(b) ciliated epithelium
(c) squamous epithelium
(d) stratified cuboidal epithelium

UP CPMT-2010, 2007
JCECE-2008

Ans. (a) : Tissue present in skin is stratified squamous epithelium. It provides protection to the underlying tissue against chemical and mechanical damage and water loss.

48. Which have no specific organ for respiration but respire ?
(a) Rabbit (b) Cockroach
(c) Earthworm (d) Frog

DUMET-2005
UP CPMT-2003

Ans. (c) : Earthworm have no specific organ for respiration but respire through their moist body surface into the air and vice versa in to the blood stream. The oxygen diffuses in the body via the skin into the capillaries that lay just below the skin.

49. Pacinian corpuscles occur in the skin of certain parts of body in mammals. These are :
(a) type of glands
(b) pain receptors
(c) naked tactile receptors
(d) encapsulated pressure receptors

AFMC -2011
Rajasthan PMT - 1998

Ans. (d) : Pacinian corpuscles occur in the skin of certain parts of body in mammals. These are encapsulated pressure receptors.
It is also known as **Vater Pacini or lamellar corpuscles,** which are sensory receptors for vibration. They are present in the whole body specially found in hands and feet.

50. Fallopian tube is lined by:
(a) pseudostratified epithelium
(b) ciliated epithelium
(c) cuboidal epithelium
(d) squamous epithelium

VMMC-2002
Rajasthan PMT - 1998

@apna_pdf

Ans. (b) : Fallopian tube is lined by ciliated epithelium cell. Fallopian tubes function as channels for oocytes transport and fertilization. The main function of cilliated cells in fallopian tube is to transport the ovum from the ovary toward the uterus and help to remove genotoxic stress after ovulation.

51. The secretion of tears, milk, sweat and oil are functions of which of the following tissues?
(a) Epithelial (b) Nervous
(c) Loose connective (d) Lymphoid

J&K CET-2012

Ans. (a) : The secretion of tears, milk, sweat and oil are functions of epithelial tissue. It covers the external surface of the body. The epithelial tissues derived from endoderm generally forms glandular epithelium which forms the linning cells of all the glands.

52. In which one of the following preparations, are you likely to come across cell junctions most frequently?
(a) Ciliated epithelium (b) Thrombocytes
(c) Tendon (d) Hyaline cartilage

Rajasthan PMT-2010

Ans. (a) : The cell junctions come across most frequently in the preparation of ciliated epithelium. They are especially abundant in epithelial tissues. Ciliated epithelium performs the function of moving particles or fluid over the epithelial surface in such structures as the trachea, etc.

53. The type of epithelial cells, which line the inner surface of Fallopian tubes, bronchioles and small bronchi, are known as
(a) squamous epithelium
(b) columnar epithelium
(c) ciliated epithelium
(d) cubical epithelium

Rajasthan PMT-2010
AIIMS-2006, 2010, 2009

Ans. (c) : The type of epithelial cells, which line the inner surface of Fallopian tubes, bronchioles and small bronchi, are known as ciliated epithelium. It is found in the lining of the fallopian tubes, bronchioles, and small bronchi. The cilia are the hair-like structures that are present on the cell and help in the movement of various particles.

54. Exposed surface of the human body is covered the tissue :
(a) glandular epithelium
(b) stratified squamous epithelium
(c) ciliated epithelium
(d) epidermis

Rajasthan PMT-1998

Ans. (b) : The exposed surface of the human body is covered by the tissue stratified squamous epithelium. It is a protective tissue that is found in the outer layer of the skin. it protects our skin from mechanical or physical damage and also prevents water loss.

55. Cutaneous glands are
(a) gastric glands (b) sebaceous glands
(c) thyroid gluids (d) thymus glands

CG PMT-2007, 2006

Ans. (b) : Cutaneous glands are sebaceous glands. They are small oil-producing gland present in the skin of mammals. These glands secrete the oily, waxy substance called **sebum** which lubricates the skin and hairs of mammals.

56. Pseudostratified epithelium is always
(a) single layered (b) double layered
(c) multilayered (d) uncertain

CG PMT-2007

Ans. (a) : Pseudostratified epithelium is always single layered that appeared to be made from multiple layers, especially when seen in cross section. The nuclei of these epithelial cells are at different levels leading to the illusion of being stratified.

57. Most of the glands of the body are of
(a) holocrine type (b) merocrine type
(c) apocrine type (d) None of these

CG PMT-2007

Ans. (b) : Most of the glands of the body are of merocrine type. They secrete their secretions stared in secretory vesicles by exocytosis. The 'salivary gland' is a type of merocrine gland.

58. The intercellular matrix is negligible or absent in which of the following tissues?
(a) Connective tissue (b) Epithelial tissue
(c) Muscular tissue (d) Cardiac tissue

CG PMT-2007

Ans. (b) : The intracellular matrix is negligible or absent in epithelial tissue because they are very closely attached to each other. The exchange of materials takes place by the sodium potassium ATPase pump.

59. Cells of the epithelial tissue rest on a basement membrane, which is made up of
(a) mono saccharides
(b) muco polysaccharides
(c) disaccharides
(d) lipids

CG PMT-2007

Ans. (b) : Cells of the epithelial tissue rest on a basement membrane, which is made up of muco polysaccharides. The basement membrane is non - cellular skinny fibrous membrane on which all epithelia rest. Epithelial is the outermost layer of cell that cover the surface of the body.

60. Zonula adherens is another name for:
(a) desmosome (b) mesosomes
(c) gap junction (d) terminal bars

Haryana PMT-2002
AIIMS-1994

Ans. (d) : Zonula adherens is also known as **terminal bars or adherens junctions.** They are protein complexes that occur at cell-cell junctions and cell-matrix junctions in epithelial and endothelial tissues, usually more basal than tight junctions.

61. Which one affects liver, muscle and adipose tissue?
(a) Androgen (b) Insulin
(c) Progesterone (d) Glucagon

Haryana PMT-2005

@apna_pdf

Ans. (b) : The liver, muscle, and adipose tissue are affected by insulin. It is secreted from β- cell of islets of langerhans. It also increases hepatic lipid synthesis for subsequent storage in adipose tissue and stimulates glucose uptake into fat and muscle.

62. Which one of the following is correct?
(a) Mesoderm - brain
(b) Ectoderm - liver
(c) Mesoderm - skeleton
(d) Endodermis-epidermis

Haryana PMT-2004

Ans. (c) : The muscles of skeletal system are formed by the mesoderm. It is one of the three primary germ layers that form during embryonic development.

63. Mammary glands are modified:
(a) sweat glands (b) ceruminous glands
(c) glands of Zeis (d) Inguinal glands

BVP-2013
Manipal-2003
Haryana PMT-2004

Ans. (a) : Mammary glands functionally produce milk, structurally, they are modified sweat glands. These glands are found in both males and females body but are more develop in females, while in males it is in rudimentary state.

64. Adjacent epithelial cells are held together by, means of
(a) microsomes (b) liposomes
(c) desmosomes (d) glyoxysomes

BVP - 2011
CMC Vellore - 2008
AMU-2006

Ans. (c) : The adjacent epithelial cells are held together by desmosomes. It form links between cells and provide a connection between intermediate filaments of the cell cytoskeletons of adjacent cells. This structure provide strength to tissues.

65. Brush bordered epithelium is found in :
(a) fallopian tube (b) small intestine
(c) stomach (d) trachea

JIPMER-2001
AIIMS-1995

Ans. (b) : Brush border cells are found mainly in the small intestine tract. It is type of columnar epithelium covered with microvilli. The brush borders of the intestinal lining are the site of terminal carbohydrate digestions.

66. An example of vestigial organ is
(a) ear of cow
(b) hair of bear
(c) nail of monkey
(d) nictitating membrane of man

Manipal-2013

Ans. (d) : The nictitating membrane (third eyelid) is located ventromedially between the lacrimal caruncle and the globes. It is present in amphibians such as frogs. It helps protect the eyes of the amphibians from water and mud while swimming in water. It also helps keep the eyes moist when the frog is on land.

67. The tissue which covers the external surface of the animal body and the internal surface of visceral organs is
(a) Epithelial tissues (b) Connective tissue
(c) Adipose tissue (d) None of these

J&K CET-2015

Ans. (a) : The tissue which covers the external surface of the animal body and the internal surface of visceral organs is epithelial tissues. It forms the outer covering on all internal and external surface of body and hollow organs. It is consists of fiber and polysaccharides secreted by epithelial cells. The function of epithelium tissue are protection, transpiration, secretion and absorption.

68. Epithelial cells of the intestine involved in food absorption have _____on their surface
(a) pinocytic vesicles (b) phagocytic vesicles
(c) zymogen granules (d) microvilli

CG PMT-2006

Ans. (d) : Epithelial cells of the intestine involved in food absorption have microvilli on their surface. They are brush- like structures which provide a larger surface area for the absorption of nutrients from the intestine.

69. In simple epithelium, the cells are
(a) continuously dividing to provide cells forming an organ
(b) hardened to provide support to the organs
(c) loosely connected to one another to form an irregular layer
(d) cemented directly to one another to form a single layer

Haryana PMT-2010

Ans. (d) : In simple epithelium, the cells are cemented directly to one another to form a single layer. An epithelium is a sheet or tube of firmly adherent cells with minimum material and space between them.

70. The main function of sweat gland is:
(a) excretion of salts
(b) water regulation
(c) thermo-regulation
(d) excretory in function

Haryana PMT-2003

Ans. (c) : The main function of sweat gland is thermo-regulation. They are coiled and tubular in structure. They secretes a watery fluid containing minor amounts of urea, lactic acid, and other substances. It is mainly water, but it also contains salts. The main function of the sweat gland is to control body temperature.

71. Salivary glands are absent in
(a) Anopheles maculipennis
(b) Musca domestica
(c) Blatta orientalis
(d) Rana hexadactyla

BVP-2015

Ans. (d) : Salivary glands are absent in *Rana hexadactyla*. The salivary gland, found in the buccal cavity of animals which helps in moisturizing and lubricating the food and turning it into bolus. Salivary glands contain a special enzyme i.e. α - amylase secreted by saliva present in buccal cavity of animal.

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72. Stratum luciderm has a shiny substance called
(a) luciferin (b) eleidin
(c) cardiolipin (d) cerumen
VMMC-2015

Ans. (b) : Stratum luciderm has a shiny substance called eleidin. It is clear intracellular protein which is present in the stratum lucidum of the skin.

73. Hair cells are present in skin they are
(a) epidermal in origin and made of dead cells
(b) epidermal in origin and made of living cells
(c) dermal in origin and made of living cells
(d) dermal in origin and made of dead cells
VMMC-2015
AIPMT-1993

Ans. (a) : Hair cells are present in skin they are epidermal in origin and made of dead cells. The hair shaft is a thin, flexible cylinder of non - living , keratinized epithelial cells. Hair is a keratinous filament growing out of the epidermis, It is primarily made of dead, keratinized cells.

74. Stratified and non-keratinised squamous epithelium occurs in
(a) epidermis of skin (b) vagina and cervix
(c) buccal cavity (d) Both (b) and (c)
VMMC-2015

Ans. (d) : Stratified and non-keratinised squamous epithelium occurs in vagina and cervix and buccal cavity. It consist of squamous (flattend) epithelial cells arranged in layers upon a basement membranes.

75. The cavities of alveoli of lungs are lined by
(a) Cuboidal epithelium
(b) Columnar epithelium
(c) Stratified cuboidal epithelium
(d) Squamous epithelium
Kerala PMT-2008
J&K CET-2007

Ans. (d) : The cavities of alveoli of lungs are lined by squamous epithelium. It helps in exchange of gases in the alveoli of lungs. The squamous epithelium are mainly found in the wall of blood vessels and air sacs of lungs.

76. Which of the following is a type of intercellular junction between animal cells?
(a) Middle lamella (b) Plasmodesmata
(c) Desmosome (d) Glycocalyx
CG PMT-2010

Ans. (c) : Desmosomes are intercellular junctions that connect intermediate filaments to the cell surface and mediate strong cell-cell adhesion.

77. The nature of sebaceous gland, present in dermis of majority of the mammals are
(a) holocrine (b) apocrine
(c) merocrine (d) Both (a) and (b)
BVP-2013

Ans. (a) : The nature of sebaceous gland, present in dermis of majority of the mammals are holocrine. It produces sebum through holocrine secretion. The sebum on the skin keeps it flexible and prevents from drying out.

78. Transitional epithelium is found in
(a) lungs (b) liver
(c) urinary bladder (d) stomach
Haryana PMT-2011

Ans. (c) : Transitional epithelium is found in urinary bladder, urethra, urinary duct etc. They are also called as urathelium. It a type of stratified epithelium . It consist of multiple layers of epithelial cell. The transition epithelium works as a barrier between the lumen and the blood stream.

79. Which of the following generally modifies into glands ?
(a) Muscular tissue (b) Nervous tissue
(c) Connective tissue (d) Epithelial tissue
AMU-2003

Ans. (d) : Epithelial tissue generally modifies into glands. It is a highly cellular tissue that overlies body surface, lines cavites and forms glands.

80. Melanin protect from
(a) U.V. rays (b) Visible rays
(c) Infrared rays (d) X-rays
AIPMT-2002

Ans. (a) : Melanin is produced by specialized endodermal cells called **melanocytes**.
Their dispersion in these cells is controlled by melanocyte- stimulating hormone & melatonin.
Melanin is a pigment present in skin and protect from harmful effects of UV-rays.

81. Proximal convoluted tubule (PCT) is lined with
(a) cuboidal epithelium
(b) simple brush border epithelium
(c) simple cuboidal brush border epithelium
(d) simple ciliated brush border epithelium
(e) columnar epithelium
Kerala PMT-2008

Ans. (c) : Proximal convoluted tubule (PCT) is lined with simple cuboidal brush border epithelium. It is characterised by the presence of microvilli over its surface . These microvilli greatly increase the surface area for absorbtion.
Simple cuboidal , epithelium are present at walls of the renal tubules and parts of the eye and thyroid, and also on the lining of nephron.

82. The thinnest skin is present on the:
(a) eyelids (b) soles of feet
(c) back of the hand (d) forehead
J&K CET-2002

Ans. (a) : The thinnest skin is present on the eyelids. Skin is thickest on the palms and soles of the feet (1.5 mm thick) while the thinnest skin is found on the eyelids and the postauricular region (0.05 mm thick).

83. The function of tracheal hair is to:
(a) pass mucus out (b) Pass mucus in
(c) pass air out (d) pass air in
BVP-2003

Ans. (a) : The function of tracheal hair is to pass mucus out. The cilia within the trachea trap foreign particles.

84. Match List I with List II and find the correct option

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List - I (Epithelial tissue)		List - II (Location)	
1.	Cuboidal	A.	Epidermis of skin
2.	Ciliated	B.	Inner lining of blood vessels
3.	Columnar	C.	Inner surface of gall bladder
4.	Squamous	D.	Inner lining of fallopian tube
5.	Keratinized squamous	E.	Lining of pancreatic duct

(a) 1 - C, 2 - D, 3 - B, 4 - C, 5 - A
(b) 1 - C, 2 - D, 3 - E, 4 - B, 5 - A
(c) 1 - E, 2 - D, 3 - C, 4 - B, 5 - A
(d) 1 - C, 2 - D, 3 - E, 4 - A, 5 - B
(e) 1 - C, 2 - E, 3 - D, 4 - A, 5 - B

Kerala PMT-2009

List - I (Epithelial tissue)		List - II (Location)	
1.	Cuboidal	E.	Lining of pancreatic duct
2.	Ciliated	D.	Inner lining of fallopian tube
3.	Columnar	C.	Inner surface of gall bladder
4.	Squamous	B.	Inner lining of blood vessels
5.	Keratinized squamous	A.	Epidermis of skin

85. The second layer of epidermis in rat integument is
(a) Stratum lucidum
(b) Stratum germinations
(c) Stratum corneum
(d) Stratum granulosum
(e) Dermis

Kerala PMT-2009

Ans. (a) : The second layer of epidermis in rat integument is stratum lucidum. It is 2-3 cell layers, present in thicker skin found in the palms and soles, is a thin clear layer consisting of eleidin which is a transformation product of keratohyalin. The epidermis and the dermis are top two layer of skin in body.

86. The inner lining of the ducts of sweat glands and pancreatic duct is formed by the epithelium
(a) Pseudostratified
(b) Stratified cubodial
(c) Stratified non - keratinized squamous
(d) Transitional

AP EAMCET-2014

Ans. (b) : The inner lining of the ducts of sweat glands and pancreatic duct is formed by the epithelium stratified cubodial. Their major functions are protection, excretion and secretion. This tissue can be found lining kidney tubules, bronchioles in lungs, etc.

87. The nasal chamber of rabbit has three thin twisted bony plates called conchae. They are lined by
(a) striated cuboidal epithelium
(b) simple cuboidal epithelium
(c) simple squamous epithelium
(d) simple ciliated columnar epithelium

JCECE-2010

Ans. (d) : The nasal chamber of rabbit has three thin twisted bony plates called conchae. They are lined by simple ciliated columnar epithelium. They have one pair of paranasal sinuses which are located in the lateral wall of the nasal cavity.

88. Part of epidermis that keeps out unwanted particles is called
(a) columnar epithelium
(b) squamous epithelium
(c) ciliated epithelium
(d) cuboidal epithelium

KVPY SB & SX-2013

Ans. (c) : Part of epidermis that keeps out unwanted particles is called ciliated epithelium. Ciliated epithelium lines the human respiratory tract from the posterior third of the nose to the bronchioles.

89. Schneiderian membrane is found in
(a) loop of henle
(b) trachea
(c) Bowman's capsule
(d) nasal mucosa

AIIMS-1995

Ans. (d) : Schneiderian membrane is found in nasal mucosa. The schneiderian membrane is the mucous membrane that covers the inner part of the maxillary sinus cavity. It is the mucous membrane of nasal passage.

90. Pseudostratified epithelium is found in
(a) seminiferous tubule (b) Fallopian tube
(c) trachea (d) kidney tubules

AIIMS-2016
DUMET-2004

Ans. (c) : Pseudostratified epithelium is found in trachea. Pseudostratified columnar epithelia are tissues formed by a single layer of cells that give the appearance of being made from multiple layers.

91. Epidermis is specialized for
(a) Respiration (b) Absorption
(c) Protection (d) All of these

AIIMS-2011

Ans. (d) : Epidermis is outer most layer of the body . It is specialised for respiration, absorption and protection . Its main function is to protect the body from damage and dehydration.

92. In lungs, the air is separated from the venous blood through
(a) transitional epithelium + tunica externa of blood vessel
(b) squamous epithelium + endothelium of blood vessel

@apna_pdf

(c) squamous epithelium + tunica media of blood vessel
(d) none of the above

AIPMT-1997

Ans. (b) : In lungs, the air is separated from the venous blood through squamous epithelium and endothelium of blood vessel.

93. Basement membrane is made up of
(a) no cell product of epithelial cell
(b) epidermal cell only
(c) endodermal cell
(d) both (b) and (c)

AIPMT-1997

Ans. (a) : Basement membrane is made up of no cell product of epithelial cell. They are a dense sheet like form of extracellular matrix (ECM) that underlie epithelia and endothelia and surround muscle, fat and Schwann cells. Basement membranes separate tissues and protect them mechanical stress.

94. The layer of actively dividing cells of skin is termed as
(a) Stratum compactum
(b) stratum corneum
(c) stratum malpighii/stratum germinativum
(d) stratum lucidum

AIPMT-1993

Ans. (c) : The layer of actively dividing cells of the skin is called the stratum malpighi/stratum germinativum. It is the innermost layer of the skin, located on the basement layer. Its cells are active and continuously produce the germinative layer.

95. The epithelial cells lining the stomach of vertebrates is protected from damage by HCl because
(a) HCl is too dilute
(b) The epithelial cells are resistant to the action of HCl
(c) HCl is neutralized by alkaline gastric juice
(d) The epithelial cells are covered with a mucous secretion

CMC Vellore-2012

Ans. (d) : The epithelial cells lining the stomach of vertebrates is protected from damage by HCl as the epithelial cells are covered with a mucous secretion. The mucus is secreted by the glands of stomach mucosa that makes a covering over the wall of the stomach, which protects the lining of the stomach from the harmful action of HCl.

96. Peyer's patches produce:
(a) Mucous (b) Trypsin
(c) Lymphocytes (d) Enterokinase

Manipal-2002

Ans. (c) : Peyer's patches produce lymphocytes. They are located in the ileum of small intestine. They are masses of lymphatic tissue.

97. Meissner's corpuscles occur in
(a) Brain (b) nerve cells
(c) skin (d) tongue

WB JEE-2011

Ans. (c) : Meissner's corpuscles occur in skin. They lie between the dermal papillae just beneath the epidermis of the fingers, palms and soles are elongated receptors formed by a connective tissue capsule that comprises several lamellae of Schwann cells.

98. From the following pairs regarding the type of animal tissue with its location. Choose the incorrect ones
(a) Pseudo stratified epithelium - Eustachian tube
(b) Keratinized stratified epithelium - Conjunctiva of eyes
(c) Squamous epithelium - Alveoli of lungs
(d) Cuboidal epithelium - Pancreatic ducts

MGIMS Wardha-2015

Ans. (b) : The conjunctiva of the eye consists of a epithelial layer which is composed of stratified columnar epithelium. It is non-keratinized with interspread goblet cells.

99. During the cold the hairs are raised and brought up more or less in vertical position by :
(a) sebaceous glands (b) hair follicles
(c) capillary plexus (d) arrector pili

J&K CET-2005

Ans. (d) : During the cold the hairs are raised and brought up more or less in vertical position by arrector pili. The arrector pili muscle is a tiny muscle connected to each hair follicle and the skin. When it contracts it causes the hair to stand erect and "goose bump" form on the skin.

100. The layer of cells that secrete enamel of tooth is:
(a) Dentoblast (b) Ameloblast
(c) Osteoblast (d) Odontoblast

DUMET-2003

Ans. (b) : The layer of cells that secrete enamel of tooth is **ameloblast.** Enamel matrix proteins are secreted by ameloblasts into the enamel space and are later degraded and proteolytically removed also by ameloblasts. Ameloblasts cover the papilla of the enamel organ.

101. Epithelial cells in animals are held by specialized junctions, one of them being "Gap junction". Function of a "Gap junction" is to
(a) facilitate cell-cell communication by rapid transfer of small molecules
(b) cement the neighbouring cells
(c) stop substances from leaking
(d) provide gaps in the tissue to facilitate uptake of small molecules across tissues

KVPY SB & SX-2016

Ans. (a) : Epithelial cells in animals are held by specialized junctions one of them being "Gap junction" function of a "Gap junction" is to facilitate cell-cell communication by rapid transfer of small molecules. Epithelial cells are held together by strong anchoring (zonula adherens) junctions. Gap junctions are cytoplasmic communications between two epithelial cells for rapid transfer of some ions and small molecule.

@apna_pdf

102. Epithelial tissue serves as
(a) protective sheath
(b) reproductive structures
(c) corpuscle
(d) nerve cells

CG PMT-2004

Ans. (a) : Epithelial tissue serves as protective sheath. It performs a variety of functions that include protection, secretion, absorption, excretion, filtration, diffusion and sensory reception.

103. Stratified epithelium is found in
(a) Seminiferous tubule
(b) Fallopian tube
(c) Nasal cavity
(d) Kidney tubules

JIPMER-2011
J&K CET-2011

Ans. (c) : Stratified epithelium is found in nasal cavity. It is a type of epithelial tissue that contains more than one layer of epithelial cells.

104. The epithelium found in the inner linings of stomach and intestine is
(a) columnar (b) squamous
(c) stratified (d) pseudo stratified

WB JEE-2015

Ans. (a) : The epithelium found in the inner linings of stomach and intestine is columnar. The mucosal lining of the stomach is simple columnar epithelium with numerous tubular gastric glands.

105. In which one of the following preparations are you likely to come across cell junctions most frequently ?
(a) Hyaline cartilage (b) Ciliated epithelium
(c) Thrombocytes (d) Tendon

AIPMT-2007

Ans. (b) : Cell junctions come across most frequently in the preparation of ciliated epithelium cell. Epithelial cells are bound together is sheets of tissue called to as epithelia.

106. Match the following lists.

List I	List II
(A) Simple squamous epithelium	(I) Ureters
(B) Simple cuboidal epithelium	(II) Epididymis
(C) Non-ciliated simple columnar epithelium	(III) Lining of alveoli of lungs
(D) Transitional epithelium	(IV) Lining of thyroid vesicles
(E) Pseudostratified non-ciliated columnar epithelium	(V) Mucosa of stomach and intestine

The correct match is

	(A)	(B)	(C)	(D)	(E)
(a)	(III)	(IV)	(V)	(I)	(II)
(b)	(I)	(II)	(IV)	(III)	(V)
(c)	(V)	(III)	(II)	(IV)	(I)
(d)	(II)	(IV)	(III)	(V)	(I)

AP EAMCET-2013

Ans. (a) :

List I	List II
(A) Simple squamous epithelium	(III)Lining of alveoli of lungs
(B) Simple cuboidal epithelium	(IV) Lining of thyroid vesicles
(C) Non-ciliated simple columnar epithelium	(V) Mucosa of stomach and intestine
(D) Transitional epithelium	(I)Ureters
(E) Pseudostratified non-ciliated columnar epithelium	(II) Epididymis

107. The mucosal lining of food pipe of mammals is composed of
(a) Simple squamous and ciliated epithelium
(b) Stratified cuboidal epithelium
(c) Stratified columar epithelium
(d) Simple columnar epithelium

UP CPMT-2014

Ans. (a) : The mucosal lining of the oesophagus (food pipe) in mammals is composed of simple squamous and ciliated epithelium. In rest of the intestine the the mucosal layer is covered by simple columnar epithelium.

108. Characteristic of simple epithelium is:
(a) They are arranged indiscriminately
(b) They make a definite layer
(c) Continue to divide and help in organ function
(d) None

AIPMT-2000

Ans. (b) : Simple epithelium is made up of a single layer of cells which is found in the lining of blood vessels, etc. These single layers of cells rest on a basement membrane. This makes a definite layer.

109. A large proportion of oxygen is left unused in the human blood even after its uptakes by the body tissues. This O_2
(a) helps in releasing more O_2 to the epithelial tissues
(b) acts as a reserve during muscular exercise
(c) raises the pCO_2 of blood to 75 mm of Hg
(d) is enough to keep oxyhaemoglobin saturation at 96%

AIPMT (Screening)-2011

Ans. (b) : A large proportion of oxygen is left unused in the human blood even after its uptakes by the body tissues. This O_2 acts as a reserve during muscular exercise.

110. Note the following :
(A) It forms the lining of the cavities of alveoli of the lungs
(B) It forms of the lining of wet surfaces like buccal cavity and oesophagus
(C) It occurs in the ducts of sweat glands
(D) It forms the lining of salivary glands and sweat glands

@apna_pdf

(E) It is a loose connective tissue

Which of the above are associated with simple epithelial tissue ?

(a) A and D (b) B and C
(c) C and A (d) D and E

AP EAMCET-2009

Ans. (a) : The simple epithelium is made up of a single layer of cells that covers the external surface of the body. They receive nutrients from underlying connective tissues.

111. Match the following lists and choose the correct option

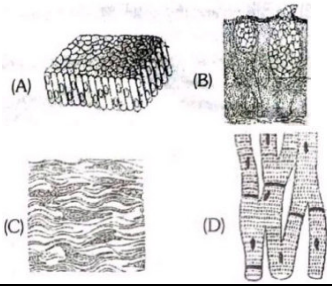
List - I	List – II
A. Columnar epithelium	**1. Larynx**
B. Ligaments	**2. Eosinopaenia**
C. Chondnoblast	**3. Elastic tissue**
D. Acidophils	**4. Urinary bladder**
E. Uninucleated spindle- shaped muscle fibres	**5. Microvilli**

(a) A-5 B-3 C-1 D-2 E-4
(b) A-5 B-1 C-3 D-2 E-4
(c) A-1 B-5 C-3 D-2 E-4
(d) A-5 B-3 C-1 D-4 E-2

Manipal-2010

Ans. (a) :
Columnar epithelium – Microvilli
Ligaments – Elastic tissue
Chondroblast – Larynx
Acidophils – Eosinopaenia
Uninucleated spindle- shaped muscle fibres – Urinary bladder

112. The four sketch (A, B, C and D) given below, represent four different types of animal tissues. Which one of these is correctly identified in the options given, along with its correct location and function



		Tissue	Location	Function
(a)	(D)	Smooth muscle tissue	Heart	Heart contraction
(b)	(A)	Columnar epithelium	Nephron	Secretion and absorption
(c)	(B)	Glandular epithelium/	Intestine	Secretion
(d)	(C)	Collagen fibres	Cartilage	Attach skeletal muscles to bones

AIPMT (Mains)-2012

Ans. (c) : It is also known as glandular tissue located in intestine, it involved in the production and release of different Secretory products, such as sweat, saliva breast milk, digestive enzymes, and hormone among many other substances.

C. Connective Tissue

113. Mast cells of connective tissue contain

(a) vasopressin and relaxin
(b) heparin and histamine
(c) heparin and calcitonin
(d) serotonin and melanin

BCECE-2014
Uttarakhand PMT-2011
JIPMER-2011
Punjab MET-2010
CG PMT-2006
AIPMT-2004

Ans. (b) : Mast cells of connective tissue contain heparin and histamine. They release these chemicals during allergic reactions and certain immune responses.

114. Which of the following protein is present in Cartilage?

(a) Actine (b) Chondrin
(c) Casein (d) Ostein

Manipal-2012
AFMC-2002
JIPMER-2000
AIPMT-1997

Ans. (b) : Chondrin protein is present in cartilage. It is also known as **cartilagin**. It helps to keep cartilage healthy by absorbing fluid into the connective tissue.

115. Blood is a kind of

(a) areolar tissue
(b) connective tissue
(c) fluid connective tissue
(d) reticular connective tissue

BCECE-2014
Jipmer - 2012
BVP-2009
Uttarakhand PMT-2009

Ans. (c) : Blood is a kind of fluid connective tissue as it has both a fluid called plasma and various other cells like RBCs, WBCs, and platelets. It helps in transporting gases, nutrients etc. to various body parts.

116. Match the following :

(A) Reticular tissue	**I. Ligament**
(B) Dense regular connective tissue	**II. Vocal cords**

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(C) Dense irregular connective tissue — **III. Basement membrane**
(D) Elastic connective tissue — **IV. Eustachian tubes**
V. Periosteum

(a) A-III, B-I, C-IV, D-II
(b) A-II, B-I, C-III, D-V
(c) A-III, B-I, C-V, D-II
(d) A-IV, B-II, C-I, D-III

TS EAMCET-10.05.2023, Shift-II

Ans. (c) :
Reticulor tissue → basment membrane
• Basement membranes are made of reticular tissue because they need to able to support and anchor other tissues.
Dense regular connective tissue → ligament
• Ligaments are made of dense regular connective tissues because they need to be strong and have a lot of tensile strength to connect together.
Dense irregular connective tissue → periostium
The periostium is made of dense regular connective tissue because it needs to be strong and protect the bone.
Elastic connective tissue → vocal cords
• Vocal cords are made of elastic connective tissue because they need to be able to stretch and vibrate to produce sound.

117. Which tissue provides thermal insulation?
(a) Areolar tissue (b) Adipose tissue
(c) Reticular tissue (d) Tendons

AP EAMCET-12.07.2022 Shift-II

Ans. (b) : Adipose tissue is specialized for energy storage and thermal insulation.
It is a fat storing tissue which forms an insulating layer below the skin which keeps the body warm.

118. The supportive skeletal structures in epiglottis and pubic symphysis of human being are the examples of
(a) Bone (b) Cartilage
(c) Adipose tissue (d) Areolar tissue

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The supportive skeletal structure in epiglottis and pubic symphysis of human beings are the example of cartilage.

119. Match the following

Connective tissue	**Example**
(A) Dense regular connective tissue	**(I) Dermis**
(B) Dense irregular connective tissue	**(II) Wharton's Jelly**
(C) Elastic connective tissue	**(III) Lymphoid organs**
(D) Mucous connective tissue	**(IV) Tendon**
	(V) Vocal Cords

The correct match is

	A	**B**	**C**	**D**
(a)	IV	III	V	II
	A	**B**	**C**	**D**
(b)	IV	I	V	II
	A	**B**	**C**	**D**
(c)	II	V	I	IV
	A	**B**	**C**	**D**
(d)	III	IV	I	II

TS EAMCET-09.08.2021 Shift-II

Ans. (b) :

Connective tissue		**Example**	
A.	Dense regular connective tissue	IV	Tendon
B.	Dense irregular connective tissue	I	Dermis
C.	Elastic connective tissue	V	Vocal Cords
D.	Mucous connective tissue	II	Wharton's Jelly

120. Match the Column-I with Column-II and select the correct option.

	Column-I		**Column-II**
A.	**Fibroblasts**	**i.**	**Storage of fat**
B.	**Mast cells**	**ii**	**Secretion of elastin fibres**
C.	**Macrophages**	**iii.**	**Secretion of histamines**
D.	**Adipocytes**	**iv.**	**Phagocytosis**

(a) A-iv, B-i, C-ii, D-iii
(b) A-ii, B-iii, C-iv, D-i
(c) A-i, B-ii, C-iii, D-iv
(d) A-iii, B-ii, C-i, D-iv

MHT CET-07.10.2020 Shift-I

Ans. (b) :

	Column-I		Column-II
A.	Fibroblasts	ii.	Secretion of elastin fibres
B.	Mast cells	iii.	Secretion of histamines
C.	Macrophages	iv.	Phagocytosis
D.	Adipocytes	i.	Storage of fat

121. The white adipose tissue appears opaque due to _____.
(a) large amount of intra-cellular protein
(b) large amount of extra-cellular fat
(c) large number of adipocytes
(d) more number of white fibres

MHT CET 5.10.2020 Shift-I

Ans. (c) : The white adipose tissue appears opaque due to large number of adipocytes. It is a specialized connective tissue present mainly beneath the skin. Its main function is to store energy in the form of lipids.

122. Which of the following is correct?

Column-I		**Column-II**	
(1)	Blood and lymph	(a)	Connective tissue
(2)	Bones and muscles	(b)	Skeletal tissue
(3)	Skin epidermis	(c)	Nervous tissue
(4)	Cartilage and muscles	(d)	Connective tissue

AIIMS-27.05.2018 Shift-II

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Ans. (a) : Blood and lymph are examples of fluid connective tissues.
- Muscle is not a skeletal tissue and also not a connective tissue.
- Skin epidermis is the outermost protective covering.
- Cartilage and muscles is not a connective tissue.

123. Match the following

List-I	List-II
A. Carcinoma	**i. B and T Lymphocytes**
B. Sarcoma	**ii. Connective tissue**
C. Lymphoma	**iii. Bone marrow cells**
D. Leukemia	**iv. Epithelial tissue**

The correct answer is:

	A	B	C	D
(a)	iv	i	ii	iii
(b)	iii	i	ii	iv
(c)	iv	ii	i	iii
(d)	iii	ii	i	iv

TS EAMCET-02.05.2018 Shift-II

Ans. (c)

List-I	List-II
A. Carcinoma	iv. Epithelial tissue
B. Sarcoma	ii. Connective tissue
C. Lymphoma	i. B and T Lymphocytes
D. Leukemia	iii. Bone marrow cells

124. Which of the following forms a strong inextensible attachment of skeletal muscle to a bone?
(a) Tendon
(b) Ligaments
(c) Areolar connective tissue
(d) Adipose tissue

VMMC-2011
CG PMT - 2005

Ans. (a) : Muscles and bones are connected by fibrous connective tissue called **tendons**. They can join muscles to object like the eyeball. A tendon helps a bone or other structure in moving.

125. Bone is mainly composed of
(a) Iron and phosphorus
(b) Sulphur and calcium
(c) Calcium and phosphorus
(d) Calcium and magnesium

WB JEE-2012

Ans. (c) : Bone is mainly composed of calcium and phosphorus make up the majority of the bone's composition. Bones are made up of hard tissues which are a kind of hard dense connective tissue.

126. The outer covering of cartilage is called
(a) Peritonium (b) periosteum
(c) endosteum (d) perichondrium

BVP-2010
WB JEE-2010

Ans. (d) : The outer covering of cartilage is called perichondrium. It protects bones from injury and damage, nourish cartilage through blood vessels, and facilitate cartilage growth.

127. Fats are richly found in
(a) alveolar tissue (b) lymph glands
(c) adipose tissue (d) liver cells

Punjab MET-1999

Ans. (c) : Fats are richly found in adipose tissue. They contain numerous nerves cells and blood vessels storing and releasing energy to fuel the body and release important hormone vital to the body's needs.

128. Which of the following cells secrets histamine?
(a) Plasma cells (b) Mast cells
(c) Monocytes (d) NK-cells

AMU-2015
Manipal-2012
Haryana PMT - 2005

Ans. (b) : Mast cells secrete histamine on exposure to the allergic component. It is also known as **mastocyte** or **labrocyte**. It also secretes heparin, serotonin etc. which help combat inflammation.

129. Aging of an animal body is associated with deterioration in its
(a) connective tissue (b) glandular tissue
(c) epithelial tissue (d) both [a] and [b]

BVP 2008
Uttarakhand PMT-2007

Ans. (a) : Aging of an animal body is associated with deterioration in its connective tissue. Aging is the time-related deterioration of the physiological functions necessary for survival and fertility.

130. Ligament connects :
(a) bone to bone (b) bone to muscle
(c) muscle to muscle (d) both b and c

AMU-2005
Uttarakhand PMT-2004
Manipal-2004

Ans. (a) : A ligament is a fibrous connecting tissue the attaches bone to bone and serves to hold structures together and keep them stable.

131. Which one is a specialized connective tissue among these?
(a) Adipose tissue (b) Bone
(c) Areolar tissue (d) Fibroblasts
(e) Muscle

Kerala PMT-2015

Ans. (b) : Specialised connective tissue include cartilage, blood and bone. These tissues contribute to diverse the functions. Bones have a hard and non pliable ground substances rich in calcium salts and collagen fibres which gives its strength.

132. Collagen fibers are characteristic of which tissue?
(a) Muscle (b) Epithelial
(c) Connective (d) Nervous

J&K CET-2012

Ans. (c) : Collagen fibers are characteristic of connective tissue. Collagen fibers form approximately 20-25% of the protein content of humans.

@apna_pdf

133. Excessive pulling of ligaments between two bones cause
(a) Fracture of the bones
(b) Sprain
(c) Breakage of the muscles
(d) All of the above

AMU -2000

Ans. (b) : Excessive pulling of ligaments between two bones cause sprain. A sprain is an injury to the band of collagen tissue i.e. a ligament, which connects two or more bones to a joint.

134. The blubber is formed by:
(a) elastic tissue (b) reticular tissue
(c) adipose tissue (d) fibrous tissue

AP EAMCET-2004

Ans. (c) : Blubber is a thick layer of fat formed by adipose tissue. Animals (like Camel) store extra digested food in the form of adipose tissue, which contains molecules called lipids.

135. Heparin is secreted by :
(a) mast cell (b) alveolar cell
(c) plasma cell (d) goblet cell

Haryana PMT-2005

Ans. (a) : Heparin is secreted by mast cells. It is an anticoagulant that is used to prevent the formation of blood clots.

136. Cartilage is produced by :
(a) chondroblasts (b) fibroblasts
(c) epithelium (d) osteoblasts

JIPMER-2000
AIIMS-1994

Ans. (a) : Cartilage is produced by chondroblast. These are an immature type of cells that secrete a huge amount of extracellular matrix made up of collagen fibres etc.

137. Which of the following is loose connective tissue?
(a) Nervous tissue (b) Blood
(c) Adipose (d) Areolar

J&K CET-2013
JIPMER-2001

Ans. (c & d) : Both adipose and areolar tissues are type of loose connective tissue. Areolar tissue serve as a support framework for epithelium. Adipose tissues helps store the energy in form of fat.

138. Organ of Golgi is the sensing structure formed at the junction of
(a) two nerves
(b) two bones
(c) nerve and muscles
(d) muscles and tendon

AMU-2008

Ans. (d) : Organ of Golgi is also known as the **Golgi tendon organ**, is a tree like sensory ending enclosed in a spindle like connective tissue capsule that lies near the junction of a tendon with a muscle. They play a role in the management of muscle tension.

139. Major constituent of vertebrate bone is:
(a) calcium phosphate (b) calcium chloride
(c) calcium oxalate (d) calcium sulphate

Haryana PMT-1999

Ans. (a) : The major constituent of vertebrate bone is calcium phosphate. The matrix of the bone is made up of 30% of collagen protein and 70% of calcium phosphate. It makes the bony framework hard and strong.

140. Increase in capillary permeability is induced by:
(a) heparin (b) gastrin
(c) histamine (d) fibrin

AP EAMCET-2001

Ans. (c) : Increase in capillary permeability is induced by histamine. It is an organic nitrogenous compound that causes vasodilation which results in fall in the blood pressure. It also stimulates the synthesis and release of various vascular smooth muscle relaxants.

141. In which of the following tissue preparations signet ring appearance is obtained ?
(a) Epithelial tissue
(b) Dense connective tissue
(c) Adipose tissue
(d) Reticular tissue

Haryana PMT-2004
Manipal-2003

Ans. (c) : Signet ring appearance is obtained is tissue preparation of adipose tissue preparation. Adipose tissue contain unilocular cells called adipocytes. These adipocytes cells contain a large lipid droplet which pushes the nucleus against the plasma membrane and giving the cell a signet ring shape.

142. Which of the following type of cartilage is found in inter-vertebral disc of mammal?
(a) Hyaline cartilage
(b) Fibrous cartilage
(c) Calcified cartilage
(d) Elastic cartilage

MGIMS Wardha-2009

Ans. (b) : The type of cartilage that is found in inter-vertebral disc of mammal fibrous-cartilage. It provides the tough material of the intervertebral discs, the intra-articular cartilages of the knee, wrist and temporo-mandibular joints.

143. The type of connective tissue that is associated with the umbilical cord is
(a) areolar connective tissue
(b) Jelly – like connective tissue
(c) adipose connective tissue
(d) reticular connective tissue

Manipal-2009
AP EAMCET - 2009

Ans. (b) : The type of connective tissue that is associated with the umbilical cord is jelly-like connective tissue which is also known as **wharton's jelly**. It provide support for the veins and arteries of the umbilical cord.

144. Difference between bone and cartilage is
(a) Haversian canal (b) blood vessel
(c) lymph vessel (d) all of these

VMMC-2007

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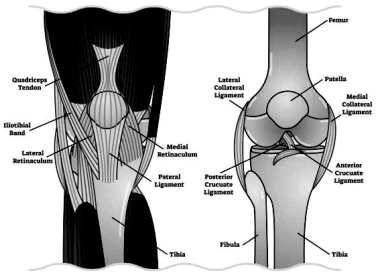
Ans. (d) : The major difference between the bone and cartilage is **Haversian canal**, it is predominately present in the bone and absent in cartilage.
These canal carry blood vessels, lymph vessels and connective tissues along with nerve

145. What will happen if ligaments are cut or broken
(a) Bones will move freely at joints
(b) No movement at joint
(c) Bone will become unfix
(d) Bone will become fixed

AIPMT-2002

Ans. (c) : The main function of ligament to joint two bones. It is a connective tissue.
- When the ligament break then the bones is unfixed in their place.
- Ligament are connected to hold each other firmly.

KNEE TENDONS



146. Achondroplasia is a disease related with the defect in the formation of
(a) membrane
(b) cartilage
(c) bone
(d) mucosa

AIIMS-1994

Ans. (b) : Achondroplasia is a disease related with the defect in the formation of cartilage. Achondroplasia is a Greek word meaning **'Without cartilage formation'** and is one of the most common causes of dwarfism.

147. Which steroid is used for transformation: -
(a) Cortisol
(b) Cholesterol
(c) Testosteron
(d) Progesteron

AIPMT-2002

Ans. (b) : Cholesterol steroid is used for transformation. It forms a major component of animal cell membranes liposome (artifically created spheres surrounded by a phospholipid bilayer like a membrane) which are used for transformation. Biotransformation is a biological process where an organic compound is modified into useable product.

148. Yellow bone marrow is found especially in the medullary cavity of
(a) short bones (b) spongy bones
(c) long bones (d) all of these

AIIMS-1996

Ans. (c) : Yellow bone marrow is found especially in the medullary cavity of long bones. It is made mostly of fat and contains stem cells (adipocytes and mesenchymal stem cells). These cells preserve fats for energy production and develop bone, cartilage, muscles and fat cells.

149. Ligament is mainly made up of
(a) reticulin (b) elastin
(c) myosin (d) collagen

JIPMER-2008

Ans. (d) : Ligament is mainly made up of collagen. Ligament is a fibrous connective tissue that attaches bones to bone and usually serves to hold structure together and keep them stable.

150. The colour in the brown fat is due is
(a) Its larger capacity for generating heat
(b) Large number of mitochondria present
(c) A high concentration of iron containing cytochrome pigments
(d) Presence of chromatophores

AIIMS-2014

Ans. (c) The colour in the brown fat is due to a high concentration of iron containing cytochrome pigment.
The adipose cells of brown fat are multilocular, each cell with several small fat globules. It is loaded with a large number of mitochondria, which is found in hibernating mammals such as rats, rodents etc.

151. Histamine secreting cells are found in
(a) connective tissues (b) lungs
(c) muscular tissue (d) nervous tissue

AIPMT-1989

Ans. (a) : Histamine secreting cells are found in connective tissues. It is an organic nitrogen compound involved in local immune responses and regulating physiological function in the gut and act as neurotransmitter.

152. Formation of cartilage bones involves
(a) deposition of bony matter by osteoblasts and resorption by chondroclasts
(b) deposition of bony matter by osteoclasts and resorption by chondroclasts
(c) deposition of bony matter by osteoclasts only
(d) deposition of bony matter by osteoblasts only

AIPMT-1993

Ans. (a) : Cartilage bone formation involves the deposition of bony material by osteoblasts and resorption by chondroclasts. Ossification is the process of the formation of cartilaginous bone. Chondroblasts are cartilage forming cells.

153. Tissue that contains fat globules is known as:
(a) duraepithelium (b) adipose tissue
(c) nepiepithelium (d) none of these

JCECE-2002

Ans. (b) : Tissue that contains fat globules is known as adipose tissue. It is also called as fatty tissue or fat tissue which is composed of a fat cells called adipocytes. They are energy storing cells that contain large globules of fat known as lipid droplets which surrounded by a structural network of fibers.

@apna_pdf

154. The white fibres are resistant to stretching and formed of a substance, the protein collagen, which on boiling with water yields

(a) Gelatin (b) Elastin
(c) Ossein (d) Chondrin

CMC Vellore-2012

Ans. (a) : The white fibres are resistant to stretching and formed of a substance, the protein collagen, which on boiling with water yields gelatin. White fibres are bounded by a mucoprotein. They are inelastic, inextensible and colourless. On boiling the collagen fibres swell up and form gelatin.

155. Adipocytes are mainly found in

(a) bones (b) cartilages
(c) connective tissue (d) nerves

WB JEE-2007

Ans. (c) : Adipocytes are mainly found in connective tissue. Adipocytes, which are fat cells makes up the adipose tissue, sometimes also known as fat tissue or fatty tissues. They are energy storing cells that contain large fat globules called lipid droplets that are surrounded by a structural network of fibres.

156. Which cell is without nucleus ?

(a) Erythrocyte (b) Leucocytes
(c) Muscles cells (d) Bone cell

Rajasthan PMT-1999

Ans. (a) : Erythrocyte cell is without nucleus. Unlike most other eukaryotic cells mature red blood cell don't have nuclei. When they enter the blood stream for the first time, they eject their nuclei and organelles, so that they can carry more hemoglobin and thus, more oxygen. Each red blood cell has a life span of about 120 days.

157. Inter-vertebral disc consists of a shock absorber connective tissue known as

(a) hyaline cartilage (b) elastic cartilage
(c) fibrocartilage (d) reticulo cartilage
(e) calcified cartilage

CMC Vellore-2008

Ans. (c) : Inter-vertebral disc consists of a shock absorber connective tissue known as fibro cartilage. It is found predominantly in the intervertebral discs of the spine and at the insertions of ligaments. It acts as a cushion within joints, where it helps manage compression forces and reduces stress placed on joints.

158. What type of cartilaginous tissue is found the inter - vertebral discs?

(a) Costal cartilage
(b) Hyaline cartilage
(c) White fibrous cartilage
(d) Yellow elastic cartilage

WB JEE-2014

Ans. (c) : White fibrous cartilage or Fibro cartilage of cartilaginous tissue is found in the inter-vertebral discs. It is a transitional tissue which is a blend of hyaline cartilage and dense fibrous connective tissue.

159. Embryonic connective tissue is derived from

(a) ectoderm (b) endoderm
(c) mesogloea (d) mesenchyme

BVP-2011

Ans. (d) : Embryonic connective tissue is derived from mesenchyme (mesoderm). It is a loosely organized embryonic connective tissue with undifferentiated cells that produce most of the tissue of the body.

160. In bony vertebrates, the laying down of bone is often preceded by the presence of :

(a) chitin (b) starch
(c) cartilage (d) platelets

Punjab MET-2005

Ans. (c) : In bony vertebrates, the laying down of bone is often preceded by the presence of cartilage. It is a strong, flexible connective tissue that protects bones and joints. It acts as a shock absorber.

161. Except blood, the cells of connective tissues secrete certain substances that act as matrix. These substances are

(a) conjugated proteins
(b) signalling molecules
(c) cholesterol
(d) growth hormones
(e) modified polysaccharides

Kerala PMT-2013

Ans. (e) : Except blood, the cells of connective tissues secrete certain substances that act as matrix. These substances are modified polysaccharides which is made up of glycoproteins, fibrous proteins and glycosaminoglycans. The matrix gives the tissue its density, which provides structural and mechanical support and also helps in the exchange of nutrients and waste.

162. The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in -

(a) tip of the nose
(b) vertebrae
(c) nails
(d) ear ossicles

AIPMT-2009

Ans. (a) : The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in tip of the nose. The yellow elastic fibrocartilage is found in the pinna, epiglottis, tip of the nose etc.

163. Match the following

List - I	List - II
A. Columnar epithelium	1. Larynx
B. Ligaments	2. Eosinopaenia
C. Chondrioblast	3. Elastic tissue
D. Acidophils	4. Urinary bladder
E. Uninucleated spindle shaped muscle fibers	5. Microvilli

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	A	B	C	D	E
(a)	5	3	1	2	4
(b)	5	1	3	2	4
(c)	1	5	3	2	4
(d)	5	3	1	4	2

AP EAMCET-2006

Ans. (a) :

List-I		List-II	
A	Columnar epithelium	**5**	Microvilli
B	Ligaments	3	Elastic tissue
C	Chondrioblast	1	Larynx
D	Acidophils	2	Eosinopaenia
E	Uninucleated spindle shaped muscle fibers	4	Urinary bladder

164. Match the types of animal tissues given under list I with the parts/organs in which they occur, given under list II.

List I (Tissue)	**List II (Part/Organ)**
(A) Squamous epithelium	(i) Walls of nose
(B) Hyaline cartilage	(ii) Bowman's capsule
(C) Adipose tissue	(iii) Iris
(D) Smooth muscle	(iv) Yellow bone marrow
	(v) Ear pinna

The correct match is :

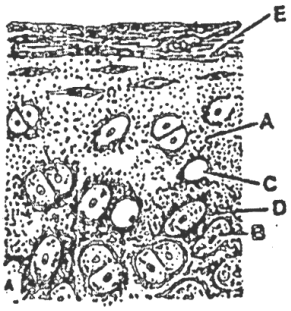
	A	B	C	D
(a)	5	1	4	2
(b)	5	4	1	3
(c)	2	1	4	3
(d)	2	4	1	3

AP EAMCET-2010

Ans. (c) :

List I (Tissue)		List II (Part/organ)
A. Squamous-epithelium	-	Bowman's Capsule
B. Hyaline Cartilage	-	Walls of nose
C. Adipose tissue	-	Yellow bone marrow
D. Smooth muscle	-	Iris

165. In the diagram of section of Hyalin cartilage, the different parts have been indicated by alphabets; choose the answer in which these alphabets correctly match with the parts they indicates.



(a) A = Chondrin; B = Chondrocyte; C = Lacunae; D = Capsular matrix; E = Perichondrium

(b) A = Chondrin; B = Lacunae; C = Chondrocyte; D = Capsular matrix; E = Perichondrium

(c) A = Perichondrium; B = Chondrocyte; C = Lacunae; D = Capsular matrix; E = Chondrin

(d) A = Capsular matrix; B = Chondrocyte; C = Lacunae; D = Perichondrium; E = Chondrin

Karnataka CET-2004

Ans. (a) : Hyaline cartilage- It is a smooth transparent glassy cartilage that covers the bone surfaces ends. It decreases the joint friction.

A = **Chondrin** is a bluish white gelatin like substance, that forms the matrix of the cartilage.

B = **Chondrocyte** are the only cells found in healthy cartilage.

C = **Lacunae** the cartilage cells in hyaline cartilage are contained in cavities in the matrix, called lacunae.

D = **Capsular matrix** is a thin zone of the matrix, that surrounds each lacuna, consist of water.

E = **Perichondrium** is a layer of dense irregular connective tissue that surrounds the cartilage of the developing bone. It is not present in fibrous cartilage.

166. Match the following columns

Column - I		**Column - II**	
A	**Skeletal tissue**	**1**	**Between muscles**
B	**Blood**	**2**	**Vascular tissue**
C	**Areolar tissue**	**3**	**Sweat glands**
D	**Serous glands**	**4**	**Cartilage**

(a) A-4 B-2 C-1 D-3

(b) A-1 B-2 C-3 D-4

(c) A-2 B-1 C-3 D-4

(d) A-4 B-2 C-1 D-3

Manipal-2011

Ans. (a) :

Column - I		Column - II	
A	Skeletal tissue	4	Cartilage
B	Blood	2	Vascular tissue
C	Areolar tissue	1	Between muscles
D	Serous glands	3	Sweat glands

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D. Muscle Tissue

167. Assertion (A): Cardiac muscle is highly resistant to fatigue.
Reason (R): Cardiac muscles are innervated by the somatic nervous system

(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) A is correct but R is incorrect.
(d) A is incorrect but R is correct.

AP EAPCET-23.05.2023, Shift-II

Ans. (c) : Assertion (A) is correct– Cardiac muscle is highly resistant to fatigue because it has a high number of mitochondria, which produce ATP. ATP is the energy source for muscle contraction.
Reason (R) is incorrect– Cardiac muscles are innervated by the autonomic nervous system, not the somatic nervous system. The somatic nervous system controls voluntary movements, while the autonomic nervous system control involuntary movements.

168. Identify the muscles that are ectodermal in origin

(a) Intercostal muscles and phrenic muscles
(b) Cardiac muscles
(c) Muscles of Iris and Ciliary body
(d) Muscles of intestine

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : Muscles of Iris and ciliary body is the muscles that are ectodermal in origin.

169. The contractile element present in a striated muscle fibril, between two successive Z-lines, is called

(a) sarcomere (b) sarcoplasm
(c) sarcosomes (d) all of these

CMC Vellore-2019
AIIMS-1994

Ans. (a) : The contractile element present in a striated muscle fibril, between two successive Z-lines is called **sarcomere**. It is the smallest functional unit of a myofibril. It occurs as repeating units along the length of a myofibril and occupy the region between Z-lines of the myofibril.

170. Which of the following cells have lost their capacity to divided in order to get specialised?

(a) Muscle cells and nerve cells
(b) Bone marrow cells and liver cells
(c) Kidney and intestinal cells
(d) Retinal cells

BVP-2010

Ans. (a) : Muscle cells and nerve cells have lost their capacity to divided is order to get specialized because they lack centrioles, which are essential for mitosis.

171. What type of muscles are found in heart?

(a) Skeletal (b) Cardiac muscles
(c) Non-striated (d) All of these

UP CPMT-2012

Ans. (b) : Cardiac muscles are found in heart. Cardiac muscles makes up the thick middle layer of the heart and is surrounded by a thin outer layer called epicardium or visceral pericardium and an inner endocardium.

172. Muscles of the heart are

(a) striated and voluntary
(b) non-striated and voluntary
(c) striated, unbranched and involuntary
(d) non-striated and involuntary
(e) striated, branched and involuntary

Kerala PMT-2015
HP CET-2012

Ans. (e) : Muscles of the heart are striated, branched and involuntary. The muscle layer of the heart is called as **myocardium.** It is responsible for the pumping of the heat.

173. The skeletal muscle fibre is a 'syncytium', which means it is

(a) made up of many fibres
(b) made up of many proteins
(c) long and slender
(d) swollen in the middle with tapered ends
(e) multinucleated

Kerala PMT-2015

Ans. (e) : Skeletal muscle fiber is " syncytium" which means it is multinucleated. They are commonly called **muscle fibres,** are multinucleated syncytia formed during development by the fusion of mononucleated precursor cells called the **myoblasts.**

174. Muscle tone' is defined as:

(a) voluntary resistance to passive strength
(b) involuntary resistance to passive strength
(c) stimulated resistance to passive strength
(d) none of these

Haryana PMT-1999

Ans. (c) : Muscle tone is defined as stimulated resistant to passive strength. It is important for generating reflexes, maintaining posture and balance etc. Muscle tone is regulated by the activity of the motor neurons and can be affected by various factors, like age, disease and nerve damage.

@apna_pdf

175. Which of the following muscle types CANNOT be used voluntarily?

(a) Both striated and smooth
(b) Both cardiac and striated
(c) Both smooth and cardiac
(d) Cardiac, striated and smooth

KVPY SA-2014

Ans. (c) : Cardiac muscle are found in the heart wall. It is an involuntary muscle that is responsible for the pumping action of the heart. Smooth muscle has no striations which is not under voluntary control, has only one nucleous per cell, which is tapered at both ends and is called **involuntary muscle**.
Both smooth muscle (unstraited muscle) and cardiac muscle are functionally involuntary.

176. Heart muscle is sensitive to

(a) heat
(b) chemical
(c) electrical
(d) heat, chemical, electrical, mechanical

VMMC-2010

Ans. (d) : Heart muscle is sensitive to heat, electrical stimuli, chemical stimuli and mechanical stimuli. The heart is made up of cardiac muscle which consist of special cell called cardiomyocytes.

177. Largest smooth muscle is present in

(a) leg
(b) thigh
(c) uterus of pregnant woman
(d) urethra

VMMC-2007
UP CPMT-2002

Ans. (c) : Largest smooth muscle present in the pregnant women's uterus. It is strongest muscle in the human body where it may reach a length of 500 nm. During pregnancy the smooth muscle cell becomes enlarged, thus the largest smooth muscle is present in uterus.

178. Cardiac muscles contract :

(a) quickly and they fatigue
(b) quickly and unfatigued
(c) slowly and are not fatigued
(d) slowly and they fatigue

BCECE-2002

Ans. (b) : The sinoatrial node is the site of electrical activity that causes cardiac muscle contraction. As a result of stimulation that spreads from the sinoatrial node, each cardiac muscle cell fibres an action potential, which causes the muscle cell to contract. The hearts muscles are cardiac. These striated muscles are uncontrollable. They never get tired and they work nonstop.

179. Lipofuscin granules are found in:

(a) nerve cell (b) cardiac muscle
(c) red muscle (d) cartilage

BVP-2003

Ans. (a) : Lipofuscin granules are found in nerve cell. It is a fine yellow brown pigment granules composed of lipid-containing residues of lysosomal digestion. It is considered to be one of the aging or "wear-and-tear" pigments, found in nerve cells, liver, kidney etc.

180. Striated muscles contract because of :

(a) Sliding of myosin rods on actin rods
(b) Sliding of actin rods on myosin rods
(c) actin rods coming close to each other
(d) myosin rods coming close to each other

Uttarakhand PMT-2006

Ans. (b) : Striated muscles contract because of sliding of actin rods on myosin rods. The sliding filament theory explains the process of muscle contraction according to which contraction of a mucles fibre takes place by the sliding of the actin over the myosin.

181. Stimulus several times greater than threshold stimulus is provided to muscle fibre. It will :

(a) contract with same force
(b) contract forcefully
(c) contract sightly
(d) undergo tetany

Uttarakhand PMT-2006

Ans. (a) : Stimulus several times greater than threshold stimulus is provided to muscle fibre. It will contract with same force.

182. Which among the following is not skeleton eye muscle?

(a) Medial reetus (b) Lateral reetus
(c) Ciliary muscle (d) Oblique muscle

BCECE-2001

Ans. (c) : Ciliary muscle is not skeleton eye muscle, it is an intrinsic muscle of the eye, formed as a ring of smooth muscle in the eye's middle layer, uvea (vascular layer) which controls accommodation for viewing objects at varying distances and regulates the flow of aqueous humor into Schlemm's canal.

183. Which of the following originates from mesoderm?

(a) Eye ball and retina (b) Dermis and heart
(c) Intestine (d) All of these

Haryana PMT-2000

Ans. (b) : Dermis and heart originates from mesoderm.

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E. Neural Tissue

184. Which one of the following cell types contains Nissl's granules?

(a) Eosinophils (b) Hepatocytes
(c) Cardiomyocyte (d) Neurons

KVPY (SA)-2021
Assam CEE-2014
BVP-2001, 2008
Uttarakhand PMT-2007
DUMET-2006
Uttarakhand-2005
J&K CET-2001

Ans. (d) : Nissl's bodies or Nissl's granules are discrete granular structures in neurons that consist of RER (rough endoplasmic reticulum). The granules are helpful in protein synthesis and transformation of protein to the cyton. The term " Nissl's Bodies" generally refers to discrete clumps of rough endoplasmic reticulum in nerve cells.

185. Cell of Schwann are associated with

(a) Nervous tissue (b) Skeletal muscle
(c) Cardiac muscle (d) Connective tissue
(e) Cartilage tissue

J&K CET-2014
UP CPMT-2010
Kerala PMT-2009
UP CPMT-2007

Ans. (a) : Cell of Schwann are associated with nervous tissue. Schwann cells are major glial cell type in the peripheral nervous system. The two type of Schwann cell are myelinating and nonmyelinating.

- Schwann cell are a type of glial cell that surrounds neurons, keeping them olive and sometimes covering them with a peripheral nervous system.

186. Which of the following is not a connective tissue?

(a) Neuroglia (b) Blood
(c) Adipose tissue (d) Cartilage

NEET-2022

Ans. (a) : Neuroglia are part of nervous tissue.

- Neuroglia are the supportive cells of nervous tissue.
- They make up more than half the volume of neural tissue.
- **Neurons,** the unit of neural system are excitable cells.

187. Pick up the incorrect statement about neuroglia.

(a) Ependymal cells are ciliated
(b) Astrocytes are phagocytic cells
(c) Oligodendrocytes form the myelin sheath
(d) Satellite cells surround the cell bodies in ganglia

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Any of the cells that hold nerve cells in place and help them work the way they should. The types of neuroglia include oligodendrocytes, atrocities, microglia, and ependymal cells also celled glial cell.

- Astrocytes are large star-shaped cells which form interconnected network arounds the neurons. They froms blood -brain barrier as they secrete basal lamina around the blood vessels.

188. Oligodendrocytes are types of _____.

(a) Plasma cells (b) Epithelial cells
(c) Neuroglial cells (d) Goblet cells

MHT CET-07.10.2020 Shift-I

Ans. (c) : Oligodendrocytes are types of neuroglial cells. Oligodendrocytes are the myelinating cells of the central nervous system (CNS) that function to produced myelin. Myelination finally produces the insulating sheath of axons of nerve fibres.

Oligodendrocytes have also been classified into categories-

(1) Interfascicular Oligodendrocytes that occur between nerve fibers in white matters.

(2) Oligodendrocytes in the neutrophils of gray matter and satellite Oligodendrocytes that are in close association with neuronal cell bodies.

189. The longest cell of human body is

(a) Skeletal muscle fibre
(b) Nerve cell
(c) Smooth muscle fibre
(d) Glial cell

HP CET-2018

Ans. (b) : The longest cell in the human body is the Nerve cell. It is approximately 3 feet in length. It carries information throughout the body.

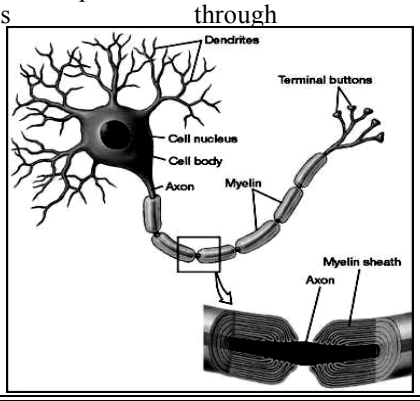
Some of the neurons are 1-1.5 meters long. The role of body part in to give signals throughout our body. The nerve cell is the primary cell in our nervous system. Humans generally have three kinds of neurons, motor neurons, sensory neurons and interneurons.

190. Which of the following statement is correct for node of Ranvier of nerve

(a) Neurilemma is discontinuous
(b) Myelin sheath is discontinuous
(c) Both neurilemma & Myelin sheath are discontinuous
(d) Covered by myelin sheath

AIPMT-2002

Ans. (b) : Myelin sheath are surrounded by Schwann cells. Neurilemma is an outer layer of Schwann cells, surrounded by axon of the neuron. The gaps between two adjacent myelin sheaths are called **nodes of Ranvier**. This provides faster transmission of electrical impulses through axon.



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191. Which one of the following systems is not mesodermal in origin?
(a) Circulatory system (b) Muscular system
(c) Nervous system (d) None of the above
J&K CET-2004

Ans. (c) : Cell of mesodermal origin are the most abundant in the human body, representing a great variety of cell types. Including the musculoskeletal system (bone, cartilage and muscle), cardiovascular system (heart blood and blood vessels), as well as the connective tissues found throughout the our bodies.

192. The following cells cannot be grown under tissue culture conditions:
(a) Hela cells (b) Leucocytes
(c) Kidney cells (d) Nerve cells
DUMET-2003

Ans. (d) : Nerve cells cannot be grown under tissue culture conditions. Cells cultured in the lab can be classified into three different types;
1. Primary cells
2. Transformed cells
3. Self-renewing cells.
• Primary cells, such as fibroblasts obtained from skin biopsies and hepatocytes isolated from liver explants, are directly isolated from human tissue.

193. Which of the following tissue originates exclusively from the ectoderm of the embryo?
(a) Epithelial tissue (b) Muscular tissue
(c) Connective tissue (d) Nervous tissue
Karnataka CET-2005

Ans. (d) : Nervous tissue originates exclusively from the ectoderm of the embryo. Nervous tissue is found in the brain, spinal cord and nerves. Nervous tissues are specialized for being stimulated to transmit stimulus from one to another part of the body rapidly.
• Nervous tissue makes up the central nervous system and other peripheral in our body. From the ectodermal cell of the embryo the nerves tissue develops.

194. In which mitosis does not takes place?
(a) Muscle cell (b) Bone cell
(c) Epithelial cell (d) Nerve cell
BCECE-2014
Rajasthan PMT-1995

Ans. (d) : Mitosis has six phases apart from interphase. The first five phase divides the nucleus and its genetic information in half, while the final step splits the entire parent cell into two identical daughter cells. In nerve cell mitosis does not take place.
• The main reason of nerve cells not dividing in that, they do not have centriole an organelles playing an important role in cell division. Through microtubuler are present in the neuron. They are unable to organism into a centriole.

195. What used to described as Nissls granules in a nerve cell are now identified as
(a) Cell metabolites (b) Fat granules
(c) Ribosomes (d) Mitochondria
BVP-2008

Ans. (c) : Nissl granules are the substances found in the neurons which are a large granular type of body. These granules are rough endoplasmic reticuloum with rosettes of free ribosomes. These are very useful for protein synthesis and also helps to transport these proteins to the part known as cyton.

196. Which of the following regarded as a unit of nervous tissue?
(a) Myelin sheath (b) Axons
(c) Dendrites (d) Neurons
Punjab MET-2010

Ans. (d) : The nervous system transmits signals between the brain and the rest of the body, including internal organs. The basic unit of the nervous system is a nerve cell or neuron.
• Neurons are specialized to transmit information throughout the body.

197. Nerve cells are the part of
(a) Epithelial tissue (b) Connective tissue
(c) Muscles tissue (d) Nervous tissue
DUMET-2005
UP CPMT-2003

Ans. (d) : The basic unit of nervous system is the nerve cell. Each nerve cell consists of the cell body, which includes nucleus, axon and dendrites. Nerve cells are also called neurons. Neurons are present all over the body, especially in brain and spinal cord.

198. The most appropriate definition of neuroglial cell are that they are
(a) Secretory cell
(b) Compound alveolar gland
(c) Non -sensory and supporting cell
(d) Sensory and supporting cells
VMMC-2013

Ans. (c) : Neuroglial cells are specialised cells found in the brain and spinal cord, supporting the neurons and their fibres.
• Star-shaped glia cells called as astrocytes and are the most abundant cell in the human brain.
• They also do not form synapses, and they retain the ability to divide through out their lifespan.

199. Lipofuscin granules are found in :
(a) Nerve cell (b) Cardiac muscle
(c) Red muscle (d) Cartilage
BCECE-2006

Ans. (a) : Lipofuscin is a brownish pigment left over from the breakdown and absorption of damaged Blood cells. Lipofuscin is found in nerve cell.
• Lipofuscin accumaulation is characteristic for nerve cells that are postmitotic. The research was focused on lipofuscin accumulation in gonglianic cells.
• Postganglionic sympathetic neurons cell bodies of the superior cervical ganglion in humans during ageing.

200. Minimum regeneration power is present in
(a) Nervous tissue (b) Connective tissue
(c) Epithelial tissue (d) None of the above
VMMC-2007
Rajasthan PMT-2005

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Ans. (a) : Nervous tissue has minimum regeneration power. Nervous tissue is composed of neurons, also called nerve cells and neurolgial cells.

• Nervous tissue has least capacity of regeneration because nerve cells are differentiated. Cells have lost the capacity of dedifferentiation.

201. Collagen fibre are secreted by :

(a) Mast cells (b) Macrophage
(c) Histiocytes (d) Fibroblasts

BCECE-2004

Ans. (d) : Fibroblasts are developmentally programmed to produce collagen matrix which is main structural component of connective tissue. Fibroblasts have cell surface receptors called integrins.

Which specifically attach to proteins in the matrix including Type 1 collagen.

202. Nodes of Ranvier are found in……..

(a) Muscle fibre (b) Neuron
(c) Axon (d) Sperm

Karnataka CET-2004

Ans. (c) A neuron is composed of 3 major parts, cell body, axon and dendrites. There are 2 types of axon namely Myelinated and non myelinated. The gaps between two adjacent myelin sheath are called node of Ranvier. The nodes of Ranvier are located along the axon of neurons.

203. Read the following statements and choose the correct option.

(i) Blood cells secrete fibres of structural proteins called collagen or elastin
(ii) Neuroglial cells protect and support the nephrons
(iii) Osteocytes are present in spaces called lacunae
(iv) Striated muscle fibres are bundles together in a parallel fashion
(v) Biceps are involuntary and striated

(a) iii and iv statement are wrong
(b) ii and iv statement are wrong
(c) i and iii statement are wrong
(d) ii and iii statement are wrong
(e) i, ii and v statement are wrong

Kerala PMT-2012

Ans. (e) : Cells of the blood tissue that do not secret fibres of structural proteins are refered to as elastin. All collagen all cells of connective tissue except blood secrete collagen.

• Neuroglial cells protect neurons from physical and chemical damage.

• The muscles of biceps are voluntary and striated.

204. Match the terms listed under column I with the structures which they occur given under column II; choose the answer which gives the correct combination of alphabets of the columns:

	Column-I (Structure)		Column-II (Occurrence)
A	Haversian canal	p	Kidney
B	Dendrites	q	Cartilage
C	Sarcolemma	r	Muscle
D	Chondrocytes	s	Nerve cells
		t	Bone

(a) A = t, B = s, C = r, D = q
(b) A = s, B = t, C = q, D = r
(c) A = q, B = r, C = s, D = t
(d) A = p, B = t, C = s, D = t

Karnataka CET-2000

Ans. (a) : Haversian canal are present in bone of mammals.

• Dendrites are the finger- like cells present on the end of a nerve cell.

• Sarcolemma - The plasma membrane of a skeletal muscle fibre is called the sarcolemma.

• Chondrocytes - The cartilage is solely composed of cells known as chondrocytes.

F. Earthworm

205. The two organisms which breathe only through their moist skin are

(a) fish and frog
(b) frog and earthworm
(c) leech and earthworm
(d) fish and earthworm

AP EAMCET-12.07.2022 Shift-II
BCECE-2015
J&K CET-2012
CG PMT-2008
AMU-2008
VMMC-2008
UP CPMT-2008
Rajasthan PMT-2008

Ans. (c) : Fish breathe through gills while frogs breathe through lung and skin.

• Leeches and earthworms breathe through their skin. Their skin is moist, thin and is supplied abundantly with blood vessals. Amphibians and fishes have numerous cutanneous glands.

206. Earthworms are

(a) ureotelic when plenty of water is available
(b) uricotelic when plenty of water is available
(c) uricotelic under conditions of water scarcity
(d) ammonotelic when plenty of water is available

BCECE-2013
CMC Vellore-2012
BHU PMT (Mains)-2010
CMC Ludhiana-2009
JCECE-2007, 2009
AFMC-2008
AIPMT-2006

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Ans. (d) : Earthworms have nephridia, an excretory organ, that helps in the removal of wastes in the form of ammonia when an excess of water is available. Earthworms are both ammonotelic, in water, and ureotelic on land.

207. Chloragogen cells of earthworms are analogous to vertebrate

(a) lungs (b) liver
(c) gut (d) kidney

BVP-2008, 2014
AFMC -2011
Uttarakhand PMT-2007
JIPMER-2006
UP CPMT-2005
MGIMS Wardha-2005
Rajasthan PMT-1998
AIIMS-1997
JIPMER-1996

Ans. (b) : Chloragogen cells are analogous to the liver of vertebrates. Chloragogen cells also called Y cells are star-shaped cells in annelids involved with excretory functions and intermediary metabolism. They are present in coelomic fluid of the earthworm and perform the similar function as the liver of human beings.

208. The function of typhlosole in earthworm is to:

(a) secrete digestive juice
(b) slowdown rate of passage of food
(c) increase absorptive area of intestinal epithelium
(d) have no function

BHU PMT (Screening)-2011
Manipal-2006
BVP-2005
Haryana PMT-2004
Rajasthan PMT-2004
Manipal-2003
JIPMER-1995

Ans. (c) : Its function to increase intestine surface area for more efficient absorption of digested nutrients. In different earthworm families, the typhlosole appears to have multiple origins.

• Typhlosolar region is a part of intestine which runs from 27th segment up to 24 to 25 segments infront of the anus. The mid dorsal wall of intestine to thrown into longitudinal fold called typhlosole.

209. In a copulating pair of Pheretima posthuma which of the two processes take place ?

(a) Internal fertilization and reciprocal fertilization
(b) Cross fertilization and reciprocal fertilization
(c) Reciprocal fertilization and internal fertilization
(d) External fertilization and internal fertilization

MGIMS Wardha-2012
HP CET-2011
AP EAMCET-2011
Rajasthan PMT-1999
BCECE-2006

Ans. (b) : In the copulating pair of pheretima posthuma cross fertilization and reciprocal fertilization process takes place. Cross fertilization means fusion of egg from one individual with a sperm or male gamete from a different Individual.

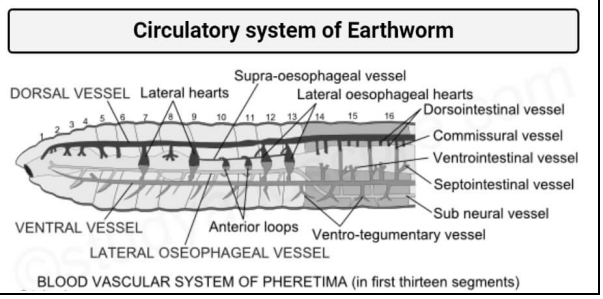
210. Blood circulation in earthworm is :

(a) Closed type
(b) Open type
(c) Haemoglobin is present in RBC
(d) Oxygen not transported by blood

AIIMS-26.05.2019 Shift-I
CMC Vellore-2011
JCECE-2008
UP CPMT-2006

Ans. (a) : Vertebrates have a **closed circulatory system**. In closed circulatory systems the blood closed within vessels of different size and wall thickness. In this system, blood is pumped by heart through vessels.

• The earthworm has a closed circulatory system that circulates blood exclusively through vessels. They have three main vessels that supply the blood to organs within the earthworm. The ventral blood vessels carrying blood back from the body of earthworm.



211. Blood of Pheretima is

(a) blue with haemocyanin in corpuscles
(b) blue with haemoglobin in corpuscles
(c) red with haemoglobin in corpuscles
(d) red with haemoglobin in plasma

CMC Vellore-2011
BVP-2010
Punjab MET-2008
Rajasthan PMT-1995
AIPMT-1990

Ans. (d) : Pheretima is a genus of earthworms that belongs to phylum annelida. The blood of phertima is red in colour due to the presence of haemoglobin, which is an iron containing pigment.

• Blood of pheretima is red in colour and respiratory pigment haemoglobin in dissolved in blood plasma.

212. The female genital pore of pheretima posthuma located upon the segment

(a) 14th (b) 16th
(c) 18th (d) 15th

VMMC-2012
JIPMER-2009
MGIMS Wardha-2008
CG PMT-2008
UP CPMT-2008
Rajasthan PMT-2008

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Ans. (a) : In pheretima posthuma (common Indian earthworm), female genital pore are present upon segment 14th, while one pair ovary an segment 13th.

• Ovarien and funnels are present beneath the ovaries which continue into oviduct join together and open on the ventral side as a single median female genital pore on the 14th segment.

213. Metanephridia is the excretory system in

(a) Cockroach (b) Locust
(c) Earthworm (d) Birds

J&K CET-2013
BCECE-2007
BVP-2001
AIIMS-2002
AFMC-2000
BCECE-2009
Rajasthan PMT-2000

Ans. (c) : Metanephridia is a type of nephridium, found in every segment of earthworm. They are an important part of the excretory system and help in the formation of urine to excrete the waste out of the body while conserving the water.

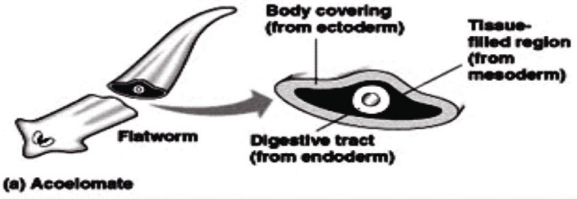
• Metanephridium is an excretory organ found in invertebrates like arthropods, annelids and molluscs.

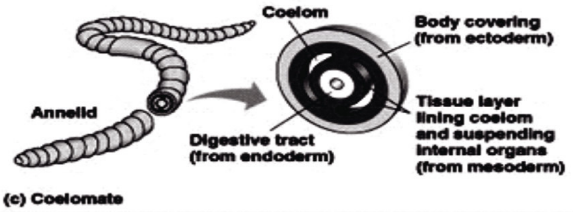
214. Earthworms have no skeleton but during burrowing the anterior end becomes turgid and acts as a hydraulic skeleton. It is due to:

(a) gut peristalsis
(b) setae
(c) coelomic fluid
(d) blood

Manipal-2012
BHU PMT (Screening)-2010
AIPMT-2009, 2008

Ans. (c) : The hydraulic skeleton is the system of support found in soft bodies invertebrates, which relies on the incompressibility of fluids contained within the body cavity. The coelomic fluid of annelids plays a role in locomotion and regulation of fluid transfer through the body wall.





• In earthworms, the coleomic fluid is under pressure within the coelom and therefore provides support for internal organs. Due to the hydraulic skeleton, during burrowing, the anterior and becomes turgid and aids in relaxation of longitudinal muscles.

215. Earthworms are

(a) useful
(b) harmful
(c) more useful than harmful
(d) more harmful

AFMC-2000
Manipal-2001
AIPMT-1990, 1989

Ans. (a) : Earthworms make the soil pores which helps in respiration and penetration of the roots for developing plants. The process of increasing soil fertility by earthworms is called vermicomposting. All over the world they are used as bait for fishing.

• Earthworms are in general beneficial to Agriculture. Their habit of burrowing and swallowing earth increases fertility of soil in many types.

216. The function of Typhlosole in earthworm is

(a) Increasing the effective area of absorption in the intestine
(b) Grinding of soil particles
(c) Grinding of decaying leaves
(d) Transportation

Karnataka CET-20.05.2023

Ans. (a) : Typhlosole is a drosal fold of the intestine in earthworms that increases the effective area of absorption in the intestine. It is a highly vascularized structure that allows for more efficient absorption of nutrients from the digested food.

217. Match the following body parts of earth worm respect to their segments

	Part		Segments
A.	Gizzard	i.	4th , 5th, & 6th
B.	Pharyngeal nephredia	ii	17th,&19th
C.	Nerve ring	iii.	8th & 9th
D.	Accessory glands	iv.	3rd & 4tn

(a) A-ii, B-i, C-iii, D-vi
(b) A-ii, B-iv, C-i, D-iii
(c) A-iii, B-iv, C-i, D-ii
(d) A-iii, B-i, C-iv, D-ii

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : • Gizzard is a muscular organ that function as a grind food. Located at 8th and 9th segments of the earthworms.

• Pharyngeal nephridia are excretory organs that help to remove waste product from the blood. They are located in the 3rd and 4th segment.

• Nerve ring–is a nerve cord that encircles the pharynx. Located in the 4th, 5th and 6th segments.

• Accessory glands–are a pair of glands that produce mucus. They are located at the 17th and 19th segments of the earthworms.

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218. The functions of enteronephric nephridia of Pheretima.
(a) Osmoregulation and excretion
(b) Excretion and digestion
(c) Digestion and respiration
(d) Osmoregulation and digestion

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : The functions of enteronephric nephridia of Pheretima osmoregulation and excretion. The nephridia are coiled, tubular like organ, filter and remove nitrogenous waste from earthworms body.

219. In earthworm nerve ring is present
(a) around the oesophagus in the 3rd and 4th segments
(b) around the pharynx in the 3rd and 4th segments
(c) around the gizzard in the 8th segment
(d) around the pharynx in the 5th and 6th segments

TS EAMCET-11.05.2023, Shift-I

Ans. (b) : In earthworm nerve ring is present around the pharynx in the 3rd and 4th segments. Nerve in earthworm encircle pharynx and comprises of supra pharyngeal ganglia located above pharynx, sub pharyngeal ganglia located above pharynx, sub pharyngeal ganglia below pharynx and circum-pharyngeal connectives connecting the supra and sub pharyngeal ganglia.

220. Rows of S-shaped setae in the body of earthworm are present in all the segments, except
(a) The first, last and clitellum
(b) The last segment
(c) The first segment
(d) The first and last segment

Karnataka CET-2022

Ans. (a) : Setae are the 'S' shaped stiff bristles present or the complete body of earthworm except for the first and last clitellar segments. Setae are chitinous structures that help in the earthworm in locomotion.

221. Study the following and pick up the incorrect statement.
(a) In Pheretima, integumentary nephridia are found in 4th, 5th and 6th segments only
(b) Tubifex is an oligochaete found in fresh water
(c) Trichinella is a round worm included in class Aphasmidia
(d) Cestodes exhibit pseudometamerism

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : In pheretima integumentary nephridia are not found in 4th, 5th and 6th segment only but occur at all segment except first two segment.

222. The following are the various external apertures in Pheretima
(A) Male genital apertures
(b) Spermathecal apertures
(c) Nephridiopres
(d) Female genital aperture
Arrange the apertures in a correct sequence from anterior end to posterior end
(a) B, C, D, A
(b) A, B, C, D
(c) C, B, A, D
(d) C, B, D, A

TS EAMCET-10.08.2021 Shift-I

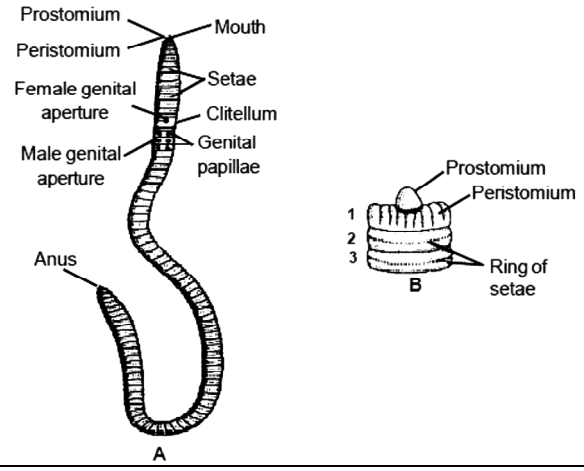
Ans. (d) :

Apperture	Segment No.
Nephridiopres -	3 to 5
Spermathecal aperture -	6 to 9
Female genital aperture-	14-16
Male genital aperture -	17-18

223. Following are the statements about prostomium of earthworm.
(A) It serves as a covering for mouth.
(B) It helps to open cracks in the soil into which it can crawl.
(C) It is one of the sensory structures.
(D) It is the first body segment.
Choose the correct answer from the options given below.
(a) (B) and (C) are correct
(b) (A), (B) and (C) are correct
(c) (A), (B) and (D) are correct
(d) (A), (B), (C) and (D) are correct

NEET-2021

Ans. (b) : In earthworm , Prostomium serves as a covering of the mouth and as a wedge to force open cracks in the soil into which the earthworm may crawl. The prostomium also act as a sensory in function.



224. Which statement in incorrect for earthworm
(a) Two pair of testis is present in 10th and 11th segment
(b) One pair of ovaries in attached at the inter-segmental septum of the 12th and 13th segment
(c) It is hermaphrodite
(d) Male genital pore is present in 14th segment

AIIMS-26.05.2019 Shift-II

Ans. (d) : A pair of male genital pores are present on the ventro-lateral sides of the 18th segment. A single female genital pore is present in the mid ventral line of 14th segment.

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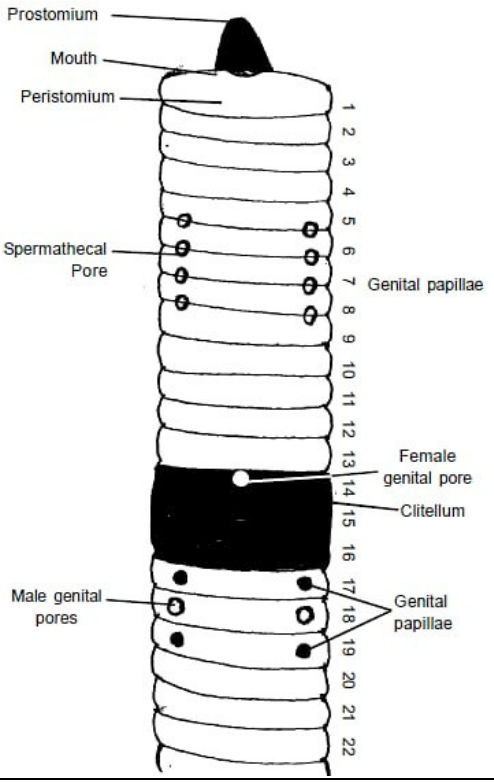


225. Mark the correct statement regarding earthworm

(a) One pair of female genital pores are present in 14th segment

(b) Four pairs of spermathecae are situated on ventro lateral sides of the intersegmental grooves i.e. 5th segments

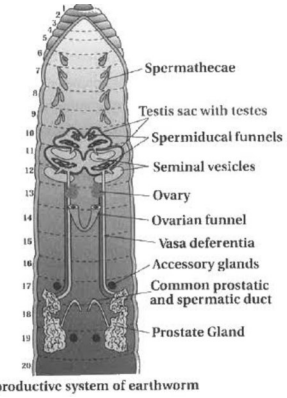
(c) Clitellum is present in 13-15 segements

(d) Four pairs of spermathecae are located in 6th-9th segments

AIIMS-25.05.2019 Shift-I
TS EAMCET-08.05.2019 Shift-II

Ans. (d) : In earth worm 4 pair of spermathecae are 5/6, 6/7, 7/8, 8/9.

• Spermathecae is a cavity where sperms are stored, there are 4 pairs of small flask shaped structure called as spermathecae. These are present ventro-laterally, one pair in each segment 6th, 7th, 8th and 9th.



Reproductive system of earthworm

226. Match the following with reference to earthworm

List -I		List-II	
(A)	**4-6th segments**	**(i)**	**Cingulum**
(B)	**14-16thsegments**	**(ii)**	**Stomach**
(C)	**9-14thsegments**	**(iii)**	**Blood glands**
(D)	**10-11thsegments**	**(iv)**	**Testes**

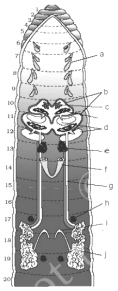
The correct answer is

	(A)	(B)	(C)	(D)
(a)	(ii)	(iii)	(i)	(iv)
(b)	(i)	(ii)	(iv)	(iii)
(c)	(iv)	(i)	(ii)	(iii)
(d)	(iii)	(i)	(ii)	(iv)

TS EAMCET-03.05.2018 Shift-I

Ans. (d) : 4-6th segments – Blood glands
14-16thsegments – Cingulum
9-14thsegments – Stomach
10-11thsegments – Testes

227. Choose the correct option from the following based on the diagram:



(a) (a) Spermathecae (e) ovary (f) ovarian funnel (j) prostate gland

(b) (a) testis sac (h) accessory glands (g) ovarian funnel, (i) prostate gland

(c) (h) Spermathecae (a) ovary (j) ovarian funnel (c) accessory glands

(d) (h) testis sac (a) accessory glands (i) ovarian funnel, (g) prostate gland

AIIMS-26.05.2018 Shift-I
Kerala PMT-2011, 2009

Ans. (a) : The given diagram is reproductive system of earthworm.
The correct labels are as follows :
(a) spermathecae (e) ovary (f) ovarian funnel (i) prostate gland.

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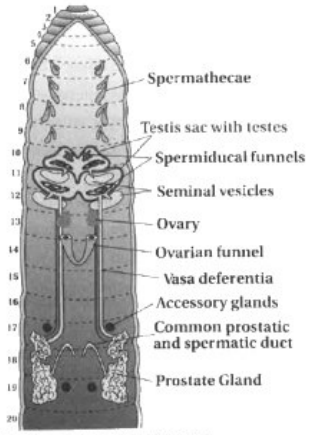


Reproductive system of earthworm

228. In earthworm, the characteristic internal median fold of dorsal wall of the intestine called typhlosole is present in
(a) 5 to 9 segments
(b) 9 to 14 segments
(c) 26 to 35 segments
(d) 15 to last segment
(e) 35 to last segment

Kerala PMT-2008

Ans. (c) : 26 to 35 segment is the present of internal median fold of dorsal wall of the intestine called typhlosole. This increases the area of absorption in the intestine.

229. Specialised chemoreceptors located on the anterior part of earthworms are
(a) heat receptors
(b) photo receptors
(c) taste receptors
(d) pressure receptors
(e) auditory receptors

Kerala PMT-2012

Ans. (c) : Specialised chemoreceptors located on the anterior part of earthworms are taste receptors indeed, earthworms are known to have chemoreceptors principally on the prostonium or on the buccal epithelium that are associated with the nervous system and more particularly with axons and dendrites.

230. Efferent salivary ducts in Periplaneta open into
(a) stomach
(b) base of pharynx
(c) base of hypopharynx
(d) base of oesophagus

JCECE-2010

Ans. (c) : Efferent salivary ducts in Periplaneta open in to base of hypopharynx.
• Each salivary gland of Periplaneta includes flattend glandular part and a long pyriform sack-like recervoir or receptacle.

231. In earthworm, gizzard is found, in which of the following segments?
(a) 9th segment (b) 18^{th}segment
(c) 13^{th}segment (d) 16^{th}segment

UP CPMT-2009

Ans. (a) : The gizzard is a prominent oval also hard, thick walled and highly muscular organ present in the eighth segment.

232. Body of earthworm is divided into how many similar segments which are called metamers or somites?
(a) 60 - 120 (b) 100 - 120
(c) 80 - 120 (d) 120 - or more

UP CPMT-2007

Ans. (b) : Body of earthworm is divided into 100 - 120 similar segments are called metamers or somites. Each segment has muscles and bristles, known as setae. That are help in the movement.

233. Microvilli of intestinal epithelium are similar in function with
(a) Typhlosole in earthworm
(b) Hepatic caecae in cockroach
(c) Intestinal caecum in earthworm
(d) Malpighian tubules in cockroach.

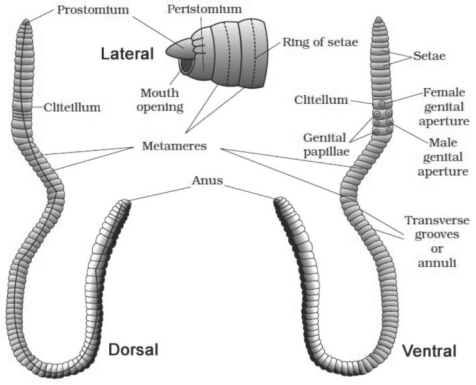
AIIMS-2010

Ans. (a) : Microvilli helps in the absorption of nutrient in the small intestine.
- Thousands of microvillus forms a brush border structure that is present on the apical area of epithelium intestine.
- Digestive system of earthworm instead of coiling the mid dorsal wall of the intestine forms a longitudinal, tongue like fold which is known as typhlosole.
- This structure helps in making the absorption of nutrient, more efficient.

234. Which one of the following correctly describes the location of some body parts in the earthworm (Pheretima)?
(a) Four pairs of spermatheca in 4-7 segments
(b) One pair of ovaries attached at inter-segmental septum of 14th and 15th segments
(c) Two pairs of testes in 10th and 11th segments
(d) Two pairs of accessory glands in 16-18th segments

AIIMS-2014

Ans. (c) : In pheretima (earthworm) two pairs of testes are present in the 10th and 11th Segments.
•Each testis is sac of the 10th segment encloses a testis and seminal Funnel. Each testis sac of the 11th Segment encloses a testis, a seminal vesicle and seminal funnel.
• A pair of spermathecae are located in each segment from 6th to 9th segments. They are structures that receive sperms after mating.
• One pair of ovaries is attached to the intersegmental septum of the 12th and 13th segments.



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235. What is common between earthworm and Periplaneta?
(a) Both have red coloured blood
(b) Both possess and styles
(c) Both have malpighian tubules
(d) Both have segmented body

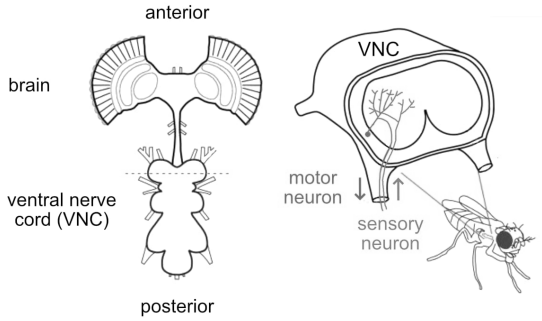
AIIMS-2012

Ans. (d) : The body of earthworm shows metameric segmentation, while in periplaneta it is externally segmented. They inhabits the upper layer of the moist soil, while in periplaneta, body is externally segmented and live in damp place both are non-chordates.
• Segmentation is mostly external in arthropods and mainly internal in man and other chordates.

236. Which one features is common to leech, cockroach and scorpion?
(a) Nephridia
(b) Ventral nerve cord
(c) Cephalization
(d) Antennae.

JIPMER-2010
AIIMS-2004

Ans. (b) : The ventral nerve cord is a cord of nervous tissue that runs the length of the animal in the lower part of its body. It is the common characteristic of lower Chordates like, leech, cockroach, Scorpion.
• Nephridia are the excretory organs in annelida like in earthworm and leech, cockroach, and scorpion.



237. Earthworm possesses hearts
(a) 6 pairs (b) 4 pairs
(c) 2 pairs (d) 1

JCECE-2007
AFMC-2006
AIPMT-1991

Ans. (b) : The earthworm's circulatory system consists of four pairs of hearts, one pair each in segments 7, 9, 12 and 13. Hearts located in the 7th and 9th segments are called lateral hearts with 4 pairs of valves and those in the 12th and 13th segments are called lateral esophageal hearts with 3 pairs of valves.

238. In Pheretima, the number of ring vessels per segment in 12th and 13th segment, is–
(a) 10 pairs (b) 10 pairs
(c) 12 pairs (d) 24 pairs

AP EAMCET - 2003
Uttarakhand PMT-2010

Ans. (c) : In Pheretima, the number of ring vessels per segment in 12th and 13th segment, is 12 pairs. These are about 12 vessels per segment. Through these vessels blood of lateral oesophageals reaches the supraesophageal.

239. Silicates consumed along with food by Pheretima and excreted by–
(a) Flame cells (b) chloragogen cells
(c) intestinal cells (d) basal cells

Uttarakhand PMT-2010

Ans. (b) : Silicates consumed along with food by pheretima and excreted by chloragogen cells. The chloragogen cells excrete silicates consumed along with the food by pheretima.

240. If an earthworm is left in 40 solution for a long time, which part would be left undissloved?
(a) Setae (b) Sperma thecae
(c) Sand particles (d) Circular muscles

Punjab MET-2007

Ans. (a) : If an earthworm is left in 40 solution for a long time, Setae would be left undissolved. Setae are chitinous structures that help the earthworm in locomotion.

241. Which of the following is the character of dorsal blood vessel of the earthworm?
(a) Collecting in the whole body
(b) Collecting in first 13 segments
(c) Distributing in the whole body
(d) Distributing in the first 13 segments

Punjab MET-2007

Ans. (d) : Ventral blood vessel is found below the alimentary canal and above the ventral nerve cord. It is also a long blood vessel that runs from second segment to the last segment of the body. In the interior segments (first 13 segments) ventral blood vessel supplies blood to the body wall..

242. The part of spermatheca of earthworm that acts as store house of spermatozoa is
(a) ampulla (b) diverticulum
(c) both [a] and [b] (d) none of these

Punjab MET-2007

Ans. (b) : The part of spermatheca of earthworm that acts as store house of spermatozoa is diverticulum. The spermatheca consists of two distinct areas, the dorsal sperm storage area, consisting of appocrine glandular epithelium and the ventral part, which includes the fertilisation area.

243. The most commonly occurring species of an earthworm in India is
(a) Pheretima communissima
(b) Eutyphacus
(c) Pheretima posthuma
(d) Lumbricus

BCECE-2015

Ans. (c) : The most commonly occurring species of an earthworm in India is pheretima posthuma. Pheretima is a genus of earthworm found mostly in New Guinea and parts of Southeast Asia.

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244. In earthworms setae are present in all segments except the :
(a) First and the last segments
(b) First and the clitellum
(c) First segment
(d) Clitellum and last segments
(e) First, clitellum and last segments

Kerala PMT-2011
Rajasthan PMT-1995

Ans. (e) : In earthworms setaes are present in all segments except the first clitellum and last segments. In each segment bear a ring of tiny curved, chitinous structure known as setae. Setae helps in locomotion and copulation.

245. Which of the following organs in earthworm neutralizes humic acid present in humus?
(a) Typhlosole
(b) Calciferous glands
(c) Intestinal caecum
(d) Gizzard

J&K CET-2013
DUMET-2011

Ans. (b) : Calciferous glands in earthworm neutraliges humic acid present in human the calciferous gland are present in segments 10th -14th , and consist of a pair of oesophageal pouches in segment 10th and a pair of oesophageal gland in each of segments 11th and 12th.
• In segment 10th the oesophageal epithelium is raised up to into long narrow longitudinal folds projecting into the lumen. Clitellum or cingulum - It is circular or glandular band around 14th, 15th and 16th, it secrets albumen, globulin and egg case (cocoon). It divides the body of the earthworm into pre-clitellar, citellar and post- clitellar.

246. Integumentary nephridia are also called:
(a) enteronephric
(b) exonephric
(c) sometimes enteronephric and sometimes exonephric
(d) both [a] and [b]

DUMET-2004

Ans. (b) : Integumentary nephridia are also called exonephric, having the excretory organs discharge through the body wall (as in some annelids worms).
• Enteronephric nephridia eject their wastes into the alimentary canal. There are smallest V shaped and without nephrostome. Integumentary nephridia are scattered in body wall of pheretima.

247. In Pheretima, septa are absent between which segments?
(a) 3/4 and 9/10 (b) 4/5 and 8/9
(c) 5/6 and 7/8 (d) 7/8 and 6/7

JIPMER-2009
Rajasthan PMT-2008
CG PMT-2008

Ans. (a) : In Pheretima, septa are absent between 3/4 and 9/10 segments. The body cavity of an earthworm is a true coelom with lies between the body wall and the alimentary canal. It is lined by the coelomic epithelium derived from the mesoderm.

248. Which parasite is present in seminal vessicle of Earth worm ?
(a) Monocystis (b) Nosema
(c) Sarcocystis (d) Nictotherus

Rajasthan PMT-1999

Ans. (a) : Monocystis parasite is present in seminal vessicle of Earthworm. Monocystis is the most common genus of protozoans to infect earthworms.

249. Segments of Earthworm are called :
(a) metamere (b) sarcomere
(c) prostomium (d) podomeres

Rajasthan PMT-1999

Ans. (a) : Segments of Earthworm are called metamere, means one of the similar body segments into which earthworms, crayfish and similar animals are divided longitudinally.
• The growing adult form known as the trophozoite and the reproductive form of these Parasites occur in the seminal vesicle of the earth worms.

250. Haemoglobin in Earthworm is present in :
(a) RBC (b) protoplasm
(c) coelomic fluid (d) plasma

MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (d) : Haemoglobin in Earthworm is present in plasma, which is the respiratory pigment that carries oxygen to different part of the body. It is present in the red blood cells of almost all vertebrates.
Erthrocytes are absent in them.

251. In earthworm the dorsal wall of the intestine from the 26th segment to 95th segment forms a median internal fold called.
(a) trochophore (b) typhlosole
(c) clitellum (d) trachea
(e) nephridium

CMC Vellore-2008

Ans. (b) : In earthworm the dorsal wall of the intestine from the 26th segment to 95th segment forms a median internal fold called typhlosole.
• Typhlosole is highly glandular, Vascular, longitudinal ridge, increasing the area for absorption of digested food.

252. Effective organ for intake of food in Earthworm is :
(a) Mouth (b) Buccal cavity
(c) Pharynx (d) Stomach

Rajasthan PMT-1995

Ans. (c) : Effective organ for intake of food in Earthworm is Pharynx. Earthworms push the pharynx out of their mouths to grasp hold of organic matter. They pull the food back into their mouths and then wet it with saliva.

253. Function of chloragogen cells of Earthworm is:
(a) Digestion (b) Locomotion
(c) Excretion (d) Respiration

Rajasthan PMT-1995
Manipal-2006

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Ans. (c) : Function of chloragogen cells of Earthworm is excretion.
• Chloragogen cells or yellow cells are present in the region of intestine in Phertima. The exact function of the cells is not fully known but, it is belived that they are concerned with storage of reserve food and also excretory in function.

254. The function of clitellum in Pheretima is:
(a) formation of cocoon
(b) secretion of hormone
(c) nutrition of sperm
(d) respiration

Rajasthan PMT-1997, 2002
BVP-2010
JCECE-2003

Ans. (a) : The function of clitellum in Pheretima is formation of Cocoon. An adult earthworm develops a belt like Swelling Called Cingulum or Clitellum, Which covers the several segments towards the front of the animal. This is a part of reproductive system that creates egg Capsules (cocoons).

255. The nephridia, in earthworm, are analogous to
(a) gills of prawn
(b) trachea of insects
(c) nematoblasts of Hydra
(d) flame cells of Planaria

VMMC-2004
Rajasthan PMT-1995

Ans. (d) : The nephridia, in earthworm are analogous to flame cells of planaria. A pair of nephridia is present on each segment of the earthworm.
• A flame cell is specialized excretory cell. These are the simplest animals to have an excretory system flame cells function like a kidney.
• Removing waste material flame cells are called protonephrdia.

256. Identify the wrong statement regarding earthworm
(a) The first body segment is called peristomium
(b) Prostomium contains the mouth
(c) Clitellum is made up of glandular tissue
(d) Prostomium is sensory in function
(e) Body setae are S-shaped

Kerala PMT-2013

Ans. (b) : Correct statement about earthworm is–
- The first body segment is called peristomium.
- Clitellum is made up of glandular tissue.
- Clitellum is sensory in function.
- Body setae are S - shaped.

257. In earthworm, the circular muscles are highely develop in:
(a) body wall (b) typhlosole
(c) gizzard (d) pharynx

Manipal-2006

Ans. (c) : Gizzard is formed when the esophagus expands and modifies into a large, distinct, Muscular organ, the gizzard helps in the digestion process, it reduces the particle size of food.

258. Which of the blood vessel is the largest in earthworm and possess valves?
(a) Dorsal blood vessel
(b) Sub-neural blood vessel
(c) Ventral blood vessel
(d) Supra oesophageal blood vessels

Manipal-2006

Ans. (a) : The dorsal blood vessel is the largest vessel. In earthworm collects blood throughout the anterior body of the earthworm. Contractile peristalsis pushes blood from anterior to posterior directions through the dorsal vessel.

259. Regarding blood circulation, it may be said that in Pheretima the dorsal vessel is a
(a) collecting vessel in first, two segments and distributing vessel in other
(b) distributing vessel in first, five segments and distributing vessel in other
(c) collecting vessel in first thirteen segments and distributing vessel in intestinal region
(d) distributing vessel in first thirteen segments and collecting vessel in intestinal region

Punjab MET-1999, 2003
AFMC-2002
Manipal-2012

Ans. (d) : In the region behind 13th segments blood laden with digested nutruient and O_2 is collected in the dorsal vessel while in anterior region of body , some of this blood in supplied by dorsal vessel to various parts.

260. Spermathecae in earthworm is :
(a) for producing sperm
(b) for storage of sperm obtained from male earthworm during copulation and used in future
(c) both a and b
(d) none of the above

Rajasthan PMT-1998
AFMC-2005

Ans. (b) : In earthworms, spermatheca is an organ of the female reproductive tract and it is an internal sac that is pear shaped. The main function of this is to receive and store the sperm from the male component of the body during copulation.

261. Life span-of Earthworm is:
(a) 1-3 yrs (b) 2-6 yrs
(c) $3\frac{1}{2}-10$ yrs (d) 61/6 - 15yrs

Rajasthan PMT-1996

Ans. (c) : Worms are the invertebrates that belong mostly to the phylum platyhelminthes and Annelida. Worm like invertebrates have a lifespan that varies according to species. For instance, earthworms such as the Red wiggler worms live between 4-5 years. Some worms get life span more than 10 years too.

262. Copulation of Earthworm lasts for:
(a) 5-6 hrs (b) 15 min
(c) 1 hrs (d) 2-3 hrs

Rajasthan PMT-1996

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Ans. (c) : Sexual intercourse, also called coitus or copulation, reproductive act in which reproduction male organ enters the female tract (reproductive). In earthworms copulation lasts for about an hour. Then the worms separate and later they lay their eggs in coccon.

263. Role of chromophill cells of Earthworm pharynx is:

(a) Fat storage (b) Helps in excretion
(c) Cocoon formation (d) Saliva secretion

Rajasthan PMT-1996

Ans. (d) : The earthworms pharynx or throat is used to grab leaves and pull them back into its mouth. Then it gets them nice and wet with saliva.

264. Earthworms have no special sense organs. Still they are sensitive to

(a) touch and sound
(b) light and sound
(c) touch, taste and sound
(d) touch, taste and light

BVP-2008
Uttarakhand PMT-2007
JIPMER-1996

Ans. (d) : Earthworms have no eyes and no ears, but they have light sensitive cells that help them to tell the difference between light and darkness. Their bodies are sensitive to vibrations.

• Earthworms do not have any receptors to perceive sound stimuli.

265. If the skin of earthworm becomes dry, it dies due to :

(a) asphyxia (b) starvation
(c) intoxication (d) dehydration

AFMC -2011

Ans. (a) : Earthworm and frog have moist and skin slimy that helps then respiration by diffusion of oxygen but, if the skin becomes dry, they well not able to respire and due to lack of oxygen asphyxia, they will die.

• Respiratory exchange occurs through moist body surface into their blood stream. If the skin of earthworm becomes dry, it dies due to asphyxia.

266. Protozoan living in the seminal vesicles of earthworm is:

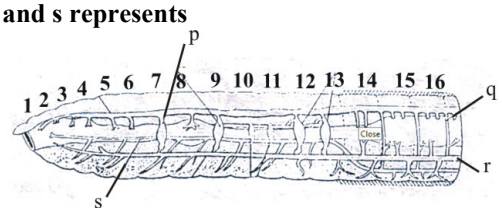
(a) Monocystis (b) Balantidium
(c) Trichonympha (d) Opalina

Rajasthan PMT-2006
JIPMER-1997

Ans. (a) : Two common parasites are monocytsis and Rhabditis, these infect earthworms only. Monocytsis is the commonest protozoan genus to infect earthworms, but another nine genera have been recorded in Britain.

Monocystis is an internal parasites which residen in the seminal vesicle of Pheretima Posthuma (earthworm).

267. In the circulatory system of Pheretima, p, q, r and s represents



(a)	(p)Lateral hearts	(q)Sub neural vessel	(r)Commissural vessel	(s)Lateral oesophageal vessel
(b)	(p)Lateral hearts	(q)Lateral oesophageal vessel	(r)Sub neural vessel	(s)Commissural vessel
(c)	(p)Lateral hearts	(q)Commissural vessel	(r)Sub neural vessel	(s)Lateral oesophageal vessel
(d)	(p)Commissural vessel	(q)Lateral hearts	(r)Lateral oesophageal vessel	(s)Sub neural vessel
(e)	(p)Commissural vessel	(q)Lateral hearts	(r)Sub neural vessel	(s)Sub oesophageal vessel

Kerala PMT-2015

Ans. (c) : In the above figure (in question given) of the circulatory system of pheretima or earthworm.

p → Lateral hearts
q → Commissural vessel
r → Sub neural vessel
s → Lateral oesophageal vessel.

268. The structure in earthworm which serves as a wedge to force open cracks in the soil is

(a) Peristomium (b) Setae
(c) Clitellum (d) Typhlosole
(e) Prostomium

Kerala PMT-2015

Ans. (e) : The prostomium is a small fleshy lobe like structure that over hangs the mouth of the Earthworm or acts as a covering for the mouth and its main function is to serve as wedge to force open cracks in the soil into which the Earthworm may crawl in or live.

269. Nephrostome is a component of :

(a) septal nephridia
(b) integumentary nephridia
(c) pharyngeal and septal nephridia
(d) pharyngeal and integumentary nephridia

Rajasthan PMT-1998

Ans. (a) : The nephredium consist of an opening called the nephrostone a long convoluted tubule and another opening called the Nephridiopore.

• Nephrostome lies in the neck region and is component of septal nephridia.

270. The lateral hearts in earthworm have

(a) four pairs of valves and are situated in segments 7 and 9
(b) four pairs of valves and are situated in segments 6 and 8
(c) three pairs of valves and are situated in segments 8 and 10
(d) two pairs of valves and are situated in segments 6 and 11

AMU-2010

@apna_pdf

Ans. (a) : The anterior loops are devoid of the valves. Four pair of valves and are situated in segment 7 and 9. The four pairs of valves in the lateral hearts allow the blood to flow only downwards. One pair is situated in the 7th segment and the other pair is situated in the 9th segment.

271. An evolutionary pattern characterized by a rapid increase in the number and kinds of closely related species is called
(a) convergent evolution
(b) divergent evolution
(c) adaptive radiation
(d) Both (b) and (c)

AMU-2010

Ans. (c) : In evolutionary biology convergent evolution is defined as the process whereby distantly related organisms independently evolve similar traits to adapt to similar necessities.
• Adaptive radiation refers to the diversification of a group of organisms into different from and occupying different ecological niches.

272. The colour of the body in earthworm is brown due to the presence of
(a) Porphyrin (b) haemoglobin
(c) blood (d) haemocyanin

UP CPMT-2001, 2013
HP CET-2012
VMMC-2004

Ans. (a) : The colour of the body in earthworm is brown due to the presence of porphyrin pigment.
• Porphyrins are a group of heterocyclic macrocycle organic compounds, composed of four modified pyrrole subunits interconnected to their are carbon atoms vill methane bridge.

273. Four pairs of pulsatile heart in Pheretima are located in segments
(a) 7, 9, 12 and 13 (b) 11, 14, 17 and 18
(c) 10, 13, 16 and 17 (d) 4, 5, 10 and 13

CG PMT-2007

Ans. (a) : Earthworms belongs to phylum annelida which is triploblastic and has a true coloem. These have segmented body. The hearts in the 12th and 13^{th}segements of earthworm are called as lateral esophageal heart. While the anterior pairs in the 7th and 9th segment are called as the lateral heart.

274. In Pheretima, locomotion occurs with the help of :
(a) circular muscles
(b) longitudinal muscles and setae
(c) circular, longitudinal muscles and setae
(d) parapodia

J&K CET-2006
Rajasthan PMT-2002

Ans. (c) : Locomotion in pheretima is carried out by longitudinal and circular muscles. Longitudinal muscles run lengthwise along the body. The circular muscles encircle the body and help in increasing or decreasing the width of the organism.

275. Select the correct statement :
(a) Birds are poikilothermic
(b) Flatworms are coelomic animals
(c) Earthworm is metamerically segmented
(d) Fishes are radially symmetrical

J&K CET-2006

Ans. (c) : Earthworm is metamerically segmented body. It belong to phylum annelida.
• Each segment is known as the metamer and the segmentation is known as metameric segmentation.

276. Blood of which of the following animals does not carry O_2?
(a) Frog (b) Insects
(c) Lung fish (d) Earthworm

JIPMER-1995

Ans. (d) : In earthworm, RBCs in blood remains absent.
• In earthworm, haemoglobin is the respiratory pigment which carries oxygen to different parts of the body. It is present in the blood plasma.

277. The function of blood gland in Pheretima is:
(a) production of RBC
(b) production of phagocytes
(c) maintenance of blood volume
(d) maintenance of blood circulation

AP EAMCET-2001

Ans. (b) : The blood glands are located in the 4th, 5th and 6th segments. These blood glands produce blood cells and haemoglobin. The blood glands are phagocyte in nature.

278. Spermatophores of Pheretima are formed due to secretions of:
(a) seminal vesicles (b) spermiducal funnel
(c) prostrate glands (d) spermathecae

AP EAMCET-2001

Ans. (c) : A pair of large prostrate glands are present in earthen in earthworms. These glands are present on either side of the intestine and extend from the 17th to 20th segment. They produce a secretion serve as a medium for the transfers of sperms.

279. Haemoglobin is found dissolved in the plasma of
(a) bird (b) man
(c) frog (d) earthworm

CMC Ludhiana-2010
DUMET-2007

Ans. (d) : Annelids have haemoglobin dissolved in plasma because they don't have a proper respiratory system and the haemoglobin is dissolved in plasma for the diffusion of gases and other materials.
• Blood glands are present on the 4th,$5^{th}$and 6th segments . They produce blood cells and hemoglobin which is dissolved in blood plasma.
• Earthworm has no red blood cells, heaemoglobin remains dissoleved in Plasma through which oxygen transport take place.

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280. Match the following lists

List-I (Pheretima)		List-II (Cell features)	
A.	**Phagocytes**	**1.**	**Small cells having yellowish granules**
B.	**Chloragogen cells**	**2.**	**Elongated cells**
C.	**Circular cells**	**3.**	**Largest cells with membranous folds**
D.	**Mucocytes**	**4.**	**Cells with characteristic markings on the surface**

The correct set is

	A	B	C	D
(a)	3	4	1	2
(b)	2	1	4	3
(c)	4	3	2	1
(d)	3	1	4	2

AP EAMCET-2008

Ans. (d) :

List-I (Pheretima)		List-II (Cell features)	
A.	Phagocytes	1.	Small cells having yellowish granules
B.	Chloragogen cells	2.	Largest cells with membranous folds
C.	Circular cells	3.	Cells with characteristic markings on the surface
D.	Mucocytes	4.	Elongated cells

281. In Pheretima, the red coloured round bodies in 4th, 5th and 6th segment above the alimentary canal are believed to be involved in:

(a) Reproduction
(b) Digestion
(c) Excretion
(d) Leucocyte production

AP EAMCET-2005

Ans. (d): 4th 5th and 6th segments above the pharyngeal mass are connected with the pharyngeal or salivary gland. Small red colored follicular bodies called blood gland are found in these segment. It produced white blood corpuscles leucocytes and hemoglobin.

282. The following are associated with Pheretima. Match them:

	List-I		List-II
A.	**Yellow cells**	**1.**	**Primordial germ cells**
B.	**Oval sphincteredpores**	**2.**	**Totipotent**
C.	**Basal cells**	**3.**	**Deamination**
D.	**Parietal layer**	**4.**	**The septum between 14/15**

	A	B	C	D
(a)	3	4	2	1
(b)	3	2	4	1
(c)	3	1	2	4
(d)	4	1	2	3

AP EAMCET-2005

Ans. (a) : List-I — **List-II**

A. Yellow Cell — 3. Deamination
B. Oval sphinctered pores — 4. The septum between 14/15
C. Basal Cell — 2. Totipotent
D. Parietal layer — 1. Primordial

• Yellow cell are also known as chloragogen cell. These take part in excretion (deamination). The septum between 14/15 segments are performed by many minute oval Sphinctered pores. Basal cell is totipotent in nature. Parietal layer takes part the formation of primordial germ cell.

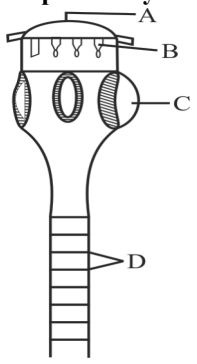
283. Which one of the following pairs of items correctly belongs to the category of organs mentioned against it?

(a) Nephridia of earthworm and malpighian tubules of cockroach - Excretory organs
(b) Wings of honeybee and wings of crow - Homologous organs
(c) Thorn of *Bougainvillea* and tendrils of *Cucurbita* - Analogous organs
(d) Nictitating membrane and blind spot in human eye - Vestigial organs

AIPMT-2008

Ans. (a) : Nephridia coiled, tubular duct like organs, filter and remove waste from an earthworm body. The excretory organ of cockroach is the malpighian tubules.
• It is found at the junction of the midgut and hind gut and about 150 in number.
• Nephridia are excretory organs in the member of Annelids. Malphghian tubules are excretory organs in Arthropod.

284. In the diagram given by the side, different parts are indicated by alphabets. Choose the answer in which these alphabets correctly match with the parts they indicate.



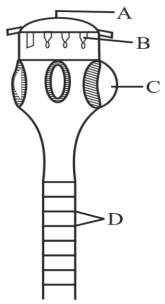
(a) A = mouth, B = Tentacles, C = Sucker, D = Segments

@apna_pdf

(b) A = Sucker, B = Hairs, C = Ring D = Proglottids
(c) A = Rostellum, B = Hooks, C = Sucker, D = Proglottids
(d) A = Suctorial mouth B = Hooks B = Sucker, D = Segments

Karnataka CET-2008

Ans. (c) :



A = Rostellum , B = Hooks
C = Sucker, D = Preglottids

285. Fertilization in earthworm occurs in
(a) cocoon (b) spermathecae
(c) coelom (d) seminal vesicles

UP CPMT-2005

Ans. (a): Earthworm is **monoecious or hermaphrodite** which reproduce sexually. They are protandrous, there is no self fertilization. Fertilization is external and occurs in cocoon.

286. In the transverse section of pheretima, identify the correct sequence of body wall layers from outer to inner side.
(A) Circular muscles
(B) Parietal peritoneum
(C) Epidermis
(D) Cuticle
(E) Longitudinal muscles
(a) C → B→E→A→D
(b) D→C→E→A→B
(c) D→C→A→E→B
(d) D→B→A→E→C

AP EAMCET-2013

Ans. (c) : D. Cuticle → C. Epidermis → A. Circular muscles→ E. Longitudinal muscles → B. Parietal peritoneum.

287. Match the following lists

List I		List II
(A) Aggregate fruitlets of berries appearing as a single fruit	(i)	Rubus
(B) Achenes on the inner margins of receptacle	(ii)	Artabotrys
(C) Etaerio of drupes	(iii)	Ficus
(D) Etaerio of follicles	(iv)	Magnolia
	(v)	Annona

The correct match is

	A	B	C	D
(a)	(v)	(iii)	(i)	(iv)
(b)	(ii)	(i)	(v)	(iv)
(c)	(ii)	(iv)	(iii)	(v)
(d)	(iv)	(iii)	(i)	(ii)

AP EAMCET-2013

Ans. (a) :
Rubus - Etaerio of drupes.
Ficus - Achenes on the inner margins of receptacles.
Magnolia - Etaerio of follicles.
Annona - Aggregate fruit lets of berries appearing as a single fruit
Artabotrys - Non-edible green round fruit.

288. Earthworm is
(a) polychaeta (b) oligochaeta
(c) hirudinea (d) None of these

UP CPMT-2011

Ans. (b): Phylum Annelida are divided into four main classes Primarily on the basis of the presence or absecnce of parapodial Setae, Metamers and other morphological features - are -
Class 1. Polychaeta
Class 2. Oligochaeta
Class 3. hirudinea
Class 4. Archiannelida
• Earthworm is the member of class oligochaeta.
• Oligochaets are mostly terrestrial, some in fresh water segmentation external and internal, head indistinct without sensory organs, few setae are embedded in the skin. Parapodial is absent.

289. In which one of the following organisms its excretory organs are correctly stated
(a) Frog –– Kidneys, skin and buccal epithelium
(b) Humans - – Kidneys, sebaceous glands and tear glands
(c) Earthworm –– Pharyngeal, integumentary and septal nephridia
(d) Cockroach –– Malpighian tubules and enteric caeca

AIPMT (Mains)-2010

Ans. (c) : Nephridia is the excretory organ of the earthworm.
- Earthworms have three types of nephridial structures called as septal, integumentary and pharyngeal nephridia.
- These three nephridial structures are present on different positions in the body and also very different in structures.
- Septal and pharyngeal nephridia are both enteronephric i.e., nitrogen products are expelled in gut. Integumentary nephridia is exonephric i.e., nitrogen waste products are directly discharge outside.
- In frogs and humans main excretory organ are kidneys, while in cockroach excretory organ are malpighian tubules.

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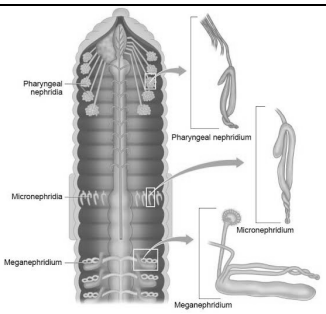

Figure: 4. 5 *Lampito mauritii* – Types of Nephridia

290. The enteronephric nephridia of Pheretima is consists of the following parts :

I. a nephrostome
II. terminal nephridial duct
III. septal excretory canal
IV. supra-intestinal excretory canal
V. long thick walled excretory canal

(a) II, V (b) I, III, IV, V
(c) III, IV, V (d) I, III, IV

AP EAMCET-2006

Ans. (a) : Enteronepheric nephridia (septal nephridia) are the largest nephridia of Pheretima. A typical septal nephridia consists of three main parts i.e,

- Nephrostome: It is ciliated funnel communicating with the coelom.
- Body of nephridia consists of two pans, a short straight lobe and a long twisted lobe.
- Terminal duct: Distal limb of nephridium ends in a short and narrow duct called terminal duct.

291. Arrange the external openings and their segmental numbers of Pheretima

Set-I	Set-II
(A) Male genital apertures	**1. Between 12/13 to last segment**
(B) Dorsal pores	**2. From 3rd to last segment**
(C) Spermathecal apertures	**3. 18th segment**
(D) Nephridiopores	**4. From 5/6 to 8/9 segment**

(a) A-2, B-1, C-3, D-4 (b) A-3, B-1, C-4, D-2
(c) A-3, B-4, C-2, D-1 (d) A-2, B-3, C-1, D-4

AP EAMCET-2007

Ans. (b) : A-3, B-1, C-4, D-2

Set-I	Set-II
(A) Male genital apertures	3. 18th segment
(B) Dorsal pores	1. Between 12/13 to last segment
(C) Spermathecal apertures	4. From 5/6 to 8/9 segment
(D) Nephridiopores	2. From 3rd to last segment

292. During the development of zygote of earthworm micromeres develop into

(a) Mesoderm
(b) Endoderm
(c) Ectoderm
(d) All the three germinal layers

AP EAMCET-2007

Ans. (b) : Micromeres give rise to the endoderm, a portion of the ectoderm, and also secondary mesenchyme cells during normal development.

- Micromeres fractionated by elutriation developed into gastrula like or exogastrula–like embryoids.

293. A transverse section of Pheretima taken through the 10th segment is observed in microscope. Which of the following structures can be observed in the section?

(a) Stomach, Dorsal blood vessel, Ventral blood vessel, Supra-oesophageal vessel, Anterior loops, Ring vessel and Micronephridia
(b) Stomach, Dorsal blood vessel, Ventral blood vessel, Lateral hearts, Ring vessels and Pharyngeal nephridia
(c) Intestine, Dorsal blood vessel, Ventral blood vessel, Supra-oesophageal vessel and Septal nephridia
(d) Stomach, dorsal blood vessel, sub neural blood vessel and Lateral hearts

AP EAMCET-2007

Ans. (a) : Stomach, dorsal blood vessel, ventral blood vessel, supra-oesopnogeal vessel, anteriar loops, ring vessel and micronephridia.

Explanation– Lateral hearts occur in 7th and 9th segment intestine-extends from 15th to last segment subneural blood vessel extends from 14th segment upto posterior end.

- Pharyngeal nephridia occur in 4th, 5th and 6th segments septal nephridia occur on both faces of each inter segmental septum behind 15th segment.
- The digestive system of earthworm is complete the following parts - mouth, buccal cavity, pharynx, oesophagus stomach, pre, typhlosolar region , interstinal, caeca which act like liver, typhlosole which increases the absorption digested food.

294. In Pheretima, gizzard, buccal cavity, pharynx oesophagus and pharyngeal nephritides receive the blood from which blood vessel

(a) supra oesophageal (b) lateral oesophageal
(c) dorsal blood (d) subneural

AP EAMCET-2009

Ans. (c) : In Pheretima posthuma, the dorsal blood vessel is considered as dorsal tubular heart. This blood vessel is a collecting blood vessel behind 13th segment, it works as the distributing vessel. The blood flows in it from backward to forward.

295. The location of lymph glands in Pheretima is

(a) 4th 5th and 6th segments
(b) 10th to 20th segments
(c) 26th to the last segments
(d) 13th segments

AP EAMCET-2009

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Ans. (c) : In Pheretima, lymph gland are present on both sides of dorsal blood vessel from segment 26th and those behind it.

296. Forests of nephridia are present in
(a) pharyngeal region
(b) clitellar region
(c) anal region
(d) None of the above

UP CPMT-2002

Ans. (b) : Nephridia lie scattered on the entire inner or Parietal surface of body wall in segment, except the first two . There are 200-250 nephridia in each segment but in the segments of clitellum (segments 14 to 16) their number increases to more than 2000 constituting the forests of nephridia.

297. Which process is related to the digestive tract of detrivores?
(a) Pulverisation (b) Osmosis
(c) Diffusion (d) Humification

UP CPMT-2013

Ans. (b) : Detrivores are the animals which feed on dead remains of plants and animals.
• The detrivores ingest dead organic compounds through their mouth, show intracellular digestion (breakdown of complex dead organic matter into the simpler forms inside the cell) and then excreted remain through the anus.

G. Cockroach

298. Which one of the following has an open circulatory system ?
(a) Pheretima (b) Periplaneta
(c) Hirudinaria (d) Octopus

AP EAMCET-25.09.2020 Shift-II
JCECE-2009, 2013
CMC Vellore-2012
CMC Ludhiana-2009, 2010
CG PMT-2007
JCECE-2009
AFMC-2008
Rajasthan PMT-2001

Ans. (b) : Periplaneta has an open type of circulataroy system in which blood or hemolymph, flows with in the body cavity or haemocoel.
• The members of phylum Annelida have closed circulatory system eg- Hirudinaria and Pheretima. Both annelids and show closed circulatory system and they are just like Octopus, which has a closed circulatory system belongs to the phylum Mollusca.

299. Heart of cockroach is
(a) 6 - chambered (b) 9 - chambered
(c) 29 - chambered (d) 13 - chambered

Tripura JEE-2022
TS EAMCET-12.05.2017
BCECE-2015
Manipal-2005, 2014
VMMC-2013
CMC Vellore-2009
Rajasthan PMT-2009
AFMC-2005

Ans. (d) : There are 13 chambers in the heart of Cockroaches. Heart of Cockroaches is multi chambered , tube-shaped. Each chamber receive oxygenated blood through a pair of aperture called Ostia.
• Cockroaches are pests that live in unsanitary and moist environments. They are dark brown in colour and belong to the arthropod phylum, Blattidae family and insect class.

300. Cockroach has 'superposition vision'. This type of vision has the following characteristic features 'EXCEPT'
(a) It generates a blurred image
(b) The ommatidium receives light not only through its own cornea but also from adjoining ommatidia
(c) It produces Mosaic Vision
(d) Superposition image is formed in the dim light and these images are formed in nocturnal insects

TS EAMCET-02.05.2018 Shift-I
J&K CET-2006
Punjab MET-2006
Rajasthan PMT-2002
NEET (Odisha)-2019
Rajasthan PMT-1999

Ans. (c) : Mosaic vision-cockroaches have eyes located on the dorsal surface of the head which are called compound eyes.
• Each eye has about 2000 hexagonal ommatidia with which they can receive multiple images of an object at once. This is called mosaic vision.

301. In cockroach, larval and nymphal characters are maintained by
(a) ecdysone (b) salivary glands
(c) parotid gland (d) juvenile hormone

VMMC-2012
UP CPMT-2008, 2012
UP CPMT-2012
JIPMER-2009
CG PMT-2008
Rajasthan PMT-2008

Ans. (d) : In cockroach larval and nymphal characters are maintained by juvenile hormone which is secreted by corpora allata (an endocrinel gland).
• The nymph of cockroach comes out from ootheca. A nymph resembles the adult in general structure but lacks the wings and mature reproductive organs.

302. Infant/Juvenile stage of Cockroach is called:
(a) Maggot (b) Nymph
(c) Zoea (d) Grub

VMMC-2014
UP CPMT-2013
JCECE-2012
Rajasthan PMT-2004, 1995

Ans. (b) : The life cycle of cockroaches is divided into three developmental stages, the egg, the young nymph and the adult cockroach. As the egg hatch, the young cockroaches known as nymph are developed.

@apna_pdf

303. **Assertion (A) : In cockroaches the sex of offspring depends on the fertilizing sperm.**
Reason (R) : Cockroach males are heterogametic with XO chromosomes
The correct option among the following is
(a) A and R are true. R is the correct explanation of A
(b) A and R are true, but R is not the correct explanation A
(c) A is true but R is false
(d) Both A and R are false

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : Assertion (A) is true. In cockroaches, the male has a single X chromosomes and no Y chromosomes while the female has two X chromosomes. So, the sex of the offspring depends on the fertilizing sperm. If the sperm carries an X chromosome, the offspring will be female. If the sperm does not carry an X chromosome, the offspring will be male.
Reason is also true. Cockroach males are heterogametic, meaning that they have different sex chromosomes. The female cockroach is homogametic meaning that she has two of the same sex chromosomes.

304. **Given below are two statements :**
Statement I : In cockroach, the forewings are transparent and prothoracic in origin.
Statement II : In cockroach, the hind wings are opaque, leathery and mesothoracic in origin.
In the light of the above statements, choose the correct answer from the options given below :
(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is correct but Statement II is false
(d) Statement I is incorrect but Statement II is true

RE-NEET (UG)-06.06.2023 (Manipur)
Tripura JEE-2017

Ans. (b) : Both statement-I and statement-II are false because, in cockroach the first pair of wings arises from mesothorax and from prothorax. Moreover they are opaque, dark and leathery and not transparent as mentioned in statement-I.
Statement-II is also incorrect as the hind wings in cockroach are transparent, membranous and are metathoracic in origin.

305. **The Cockroach is :**
(a) Ureotelic only
(b) Ureotelic and Uricotelic
(c) Ammonotelic only
(d) Uricotelic only

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : The cockroach is uricotelic because cockroach excretion is performed by malpighian tubules. Each tubule is lined by glandular and cilliated cells. They absorb nitrogenous waste products and convert them into uric acid which is excreted out through the hindgut.
■ Mammals, many terrestrial amphibians and marine fishes are ureotelic in nature.
■ Many bony fishes, aquatic insects are ammonotelic in nature.

306. **In cockroach, excretion is brought about by-**
A. Phallic gland
B. Urecose gland
C. Nephrocytes
D. Fat body
E. Collaterial glands
Choose the correct answer from the options given below:
(a) B and D only (b) A and E only
(c) A, B and E only (d) B, C and D only

NEET (UG) 07.05.2023

Ans. (d) : Malpighian tubules, uricose gland, fat body and nephrocytes are elements of the cockroach's excretory system that aid in the evacuation of nitrogenous waste as well as the formation of uric acid.
• Collateral glands found in female cockroach and aid in the secretion of the ootheca egg casing.
• Phallic gland is a part of the male reproductive gland. It is large club-shaped secretes the outer most layer.

307. **Which of the following is characteristic feature of cockroach regarding sexual dimorphism?**
(a) Presence of anal cerci
(b) Dark brown body colour and anal cerci
(c) Presence of anal styles
(d) Presence of sclerites

NEET (UG) 07.05.2023

Ans. (c) : Sexual dimorphism in cockroaches varies widely. In the cockroach, males and females have slightly different morphology, hence showing sexual dimorphism. Male cockroach bear a pair of short, thread like anal style which are absent in female.

308. **Match List - I with List - II regarding the organs of Cockroach:**

List-I		List-II	
A.	**Crop**	**i.**	**grinding the food particles**
B.	**Proventriculus**	**ii.**	**secretion of digestive juice**
C.	**Hepatic caecae**	**iii.**	**removal of nitrogenous waste**
D.	**Malpighian tubules**	**iv.**	**storage of food**

Choose the correct answer from the options given below:
(a) (A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)
(b) (A) - (iii), (B) - (ii), (C) - (i), (D) - (iv)
(c) (A) - (ii), (B) - (iv), (C) - (i), (D) - (iii)
(d) (A) - (i), (B) - (iv), (C) - (iii), (D) - (ii)

NEET (Re-Exam)-04.09.2022

Ans. (a) :
Crop → Storage of food.
Proventriculus → Grinding the food particles.
Hepatic caecae → Secretion of digestive Juice.
Malpighian tubules → Removal of nitrogenous waste.

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309. In cockroaches, digestive juice is secreted by the

(a) gizzard
(b) Malpighian tubules
(c) crop
(d) oesophagus
(e) hepatic caeca

NEET (Re-Exam)-04.09.2022
Kerala PMT-2012

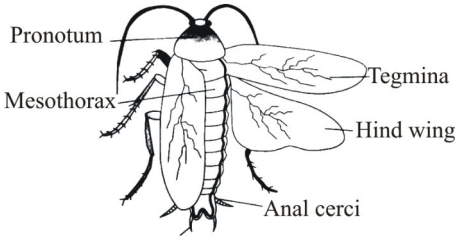
Ans. (e) : The hepatic caeca is located at the junction of the foregut and midgut of the cockroach and is composed of 6-8 thin, transparent cecal tubules. These tubules are arranged in rosettes. It helps in digestion by secreting digestive juices. It produces digestive enzymes.

310. Tegmina in cockroach, arises from

(a) Prothorax and Mesothorax
(b) Prothorax
(c) Mesothorax
(d) Metathorax

NEET-2022

Ans. (c) : Tegmina or forewings (The first pair of wings) in cockroach arises from mesothorax.
- No wing arises from prothorax. It lacks wings.
- Hind wings arises from meta thorax.



311. Number of rectal papillae present in cockroach

(a) Three (b) Six
(c) Nine pairs (d) Six pairs

TS EAMCET-09.08.2021 Shift-II

Ans. (b) : In cockroach, the inner walls of the rectums has six longitudinal chitinous folds, called '**Rectal papillae**'. They help in the reabsorption of water from the undigested food.

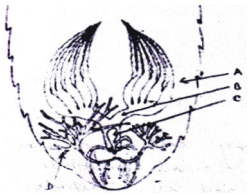
312. In corpora adipose of cockroach, function of oenocytes is

(a) Store food
(b) Contain Symbiotic bacteria
(c) Store lipids
(d) Store uric acid

TS EAMCET-09.08.2021 Shift-II

Ans. (c) : In corpora adipose of cockroach, function of oenocytes is store lipids. Oenocytes have been implicated in the regulation of energy metabolism.

313.



Observe the above diagram of female reproductive system of cockroach and identify A, B, C and D

	A	B	C	D
(a)	Oviduct	Ovariole	Gonapophysis	Spermathecae
(b)	Ovariole	Oviduct	Genital Pouch	Conglobate gland
(c)	Germanium	Vagina	Phalic gland	Utricular gland
(d)	Ovary	Oviduct	Spermathecae	Collaterial glands

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : The female reproductive system of cockroach consist of two large ovaries. The ovaries lie laterally in the 2nd - 6th abdominal segments. Each ovary is formed of a group of eight ovarian tubules or ovarioles. They contain a chain of developing ova. Oviducts from each ovary unit into a single median oviduct (also called vagina) and it opens into the genital chamber. A pair of spermatheca is present in the 6th segment which opens into the genital chamber.

314. In a certain taxon of insects (Example: Cockroach), some have 17 chromosomes and the others have 18 chromosomes. The 17 and 18 chromosomes bearing organisms are _____

(a) All males
(b) All females
(c) Males and females respectively
(d) Females and males respectively

AP EAMCET-06.09.2021 Shift-I

Ans. (c): In a certain taxon of insects (**e.g. - cockroach)** some have 17 chromosomes and the others have 18 chromosome. The 17 and 18 chromosome bearing organisms are males and females respectively. Because the sex determination in this taxon of insects is of male heterogamty with XO type. This means females have their eggs bearing an additional X chromosome besides autosomes.

315. The inner surface of labrum of cockroach bears_____

(a) Gustatory Sensillae
(b) Olfactory Sensillae
(c) Nasireceptor Sensillae
(d) Chemoreceptor Sensillae

AP EAMCET-06.09.2021 Shift-I

Ans. (a): The inner surface of labrum of cockroach bears gustatory sensillae. The labrum of partially or completely obscures the mandibles and helps hold food in a position when the insect feeds.

316. Study the following and pick up the correct statements

I. Contraction of the dorso longitudinal muscles elevate the wings in cockroach

II. Rectal papillae help in water conservation in cockroach

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III. Second chamber of heart from the anterior part lies in metathorax of cockroach

IV. Inner cuticular lining of the trachea of cockroach is called intima

(a) I, II (b) II, IV
(c) III, IV (d) I, III

TS EAMCET-10.08.2021 Shift-I

Ans. (b) : Relaxation of dorso ventral muscle help in depressing the wing in cockroach during flight.

- Rectal papillae are 6 longitudinal folds found in inner wall of rectum these rectal papillae help in conservation of water in cockroach.
- Inner cuticular lining of trachea of cockroach called **intima**. Intima produce chitinous ring called **Taenidia**. Taenidia preserved the collapse of the trachea.

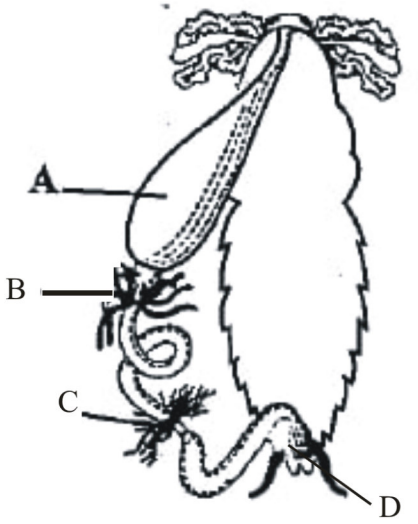
317. The following reaction takes place in this part of cockroach, Potassium urate $+CO_2 + H_2O \rightarrow KHCO_3 + H_2O$ + uric acid

(a) Rectum
(b) Hepatic caecae
(c) Malpighian tubules
(d) Haemocoel

TS EAMCET-10.08.2021 Shift-I

Ans. (c) : Malpighian tubules absorb nitrogenous waste product. Potassium urate ($KC_5H_3N_4O_3$) is nitrogenous compound. Potassium urate is absorbed and uric acid is released.

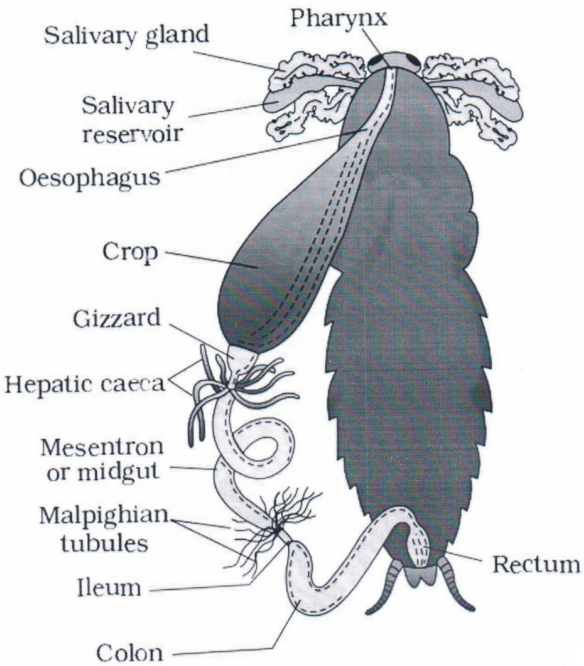
318. Study the following diagram and identify A, B, C and D



	A	B	C	D
(a)	Oesophagus	Malpighian tubules	Hepatic caecae	Ileum
(b)	Crop	Hepatic caecae	Malpighian tubules	Rectum
(c)	Stomach	Trachea	Malpighian tubules	Ileum
(d)	Gizzard	Malpighian tubules	Gastric caecae	Rectum

TS EAMCET-10.08.2021 Shift-I

Ans. (b) :



319. Anus in cockroach occurs on ————

(a) 9th sternum
(b) 10th sternum
(c) Dorsal surface of 10th tergum
(d) Ventral surface of 10th tergum

AP EAMCET-03.09.2021 Shift-I

Ans. (d) : In cockroach anus occurs on ventral surface of 10th tergum.The anus is the opening through which the gastrointestinal canal ends and exits outside the body.

320. What external changes are visible after the last moult of a cockroach nymph ————

(a) Labium develops
(b) Anal cerci develop
(c) Both fore wings and hind wings develop
(d) Hind wings develop

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : The development of fore wings and hind wings are external changes that are visible after the last moult of a cockroach nymph. Cockroach undergoes paurometabolus development. Nymph undergoes moulting about 13 times to reach the adult form.

321. Digestion in Periplaneta begins in _____

(a) Pharynx (b) Pre oral cavity
(c) Crop (d) Midgut

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : The digestive system of Periplaneta consists of foregut, midgut and hindgut. Food is taken by mouth, it enter in pre oral cavity. From here it enters in the mouth and mixes with saliva and then enters in the crop.

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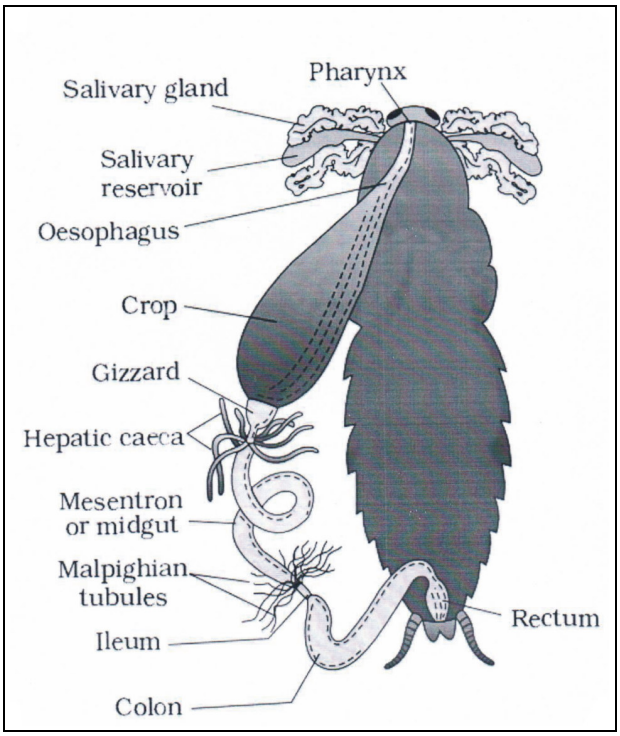

322. Which of the following abdominal segment of cockroach is without a nerve ganglion?

(a) 1st segment (b) 2nd segment
(c) 5th segment (d) 7th segment

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : 5th segment of cockroach is without a nerve ganglion nerve. Nerve ganglion occurs in 1-7 segments.

323. Stomodeal valve is formed from

(a) Crop (b) Mesenteron
(c) Gizzard (d) Ventriculus

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : Stomodeal valve is formed from Gizzard. Gizzard of cockroach helps in the crushing of food and is considered to be a part of digestive system. The crop opens into a short, muscular organ called gizzard or proventriculus.

324. In cockroach, the ootheca are formed by secretion of _____

(a) Collateral gland (b) Mushroom gland
(c) Phallic gland (d) Conglobate gland

AP EAPCET-07.09.2021 Shift-I

Ans. (a) : : The collateral glands of the cockroach are the sexual accessory glands, present in 3rd and 4th abdominal segments of female cockroach and helps in secretion of egg case of Ootheca. Collateral glands are present in female cockroaches as part of the reproductive system.

325. In the given diagram ommatidium of cockroach. Identify the parts labelled 1, 2, 3, 4, 5, 6 and select the correct option?

Graph

(a) 1–Cone, 2–Corneagen cells, 3–Cornea, 4–Retinal pigmental sheath, 5–Rhabdome, 6–Nerve fibers
(b) 1–Cornea, 2–Corneagen cells, 3–Cone, 4–Retinal pigmental sheath, 5–Nerve fibers, 6–Rhabdome
(c) 1–Cornea, 2–Cone, 3–Corneagen cells 4–Retinal pigmental sheath, 5–Nerve fibers, 6–Rhabdome
(d) 1–Cornea, 2–Corneagen cells, 3– Cone, 4–Retinal pigmental sheath, 5– Rhabdome, 6–Never fibers

AP EAPCET-07.09.2021 Shift-I

Ans. (d) :
A- Cornea
B- Corneagen cell
C- Cone
D- Retinal pigmental sheath
E- Rhabdome
F- Never fibers

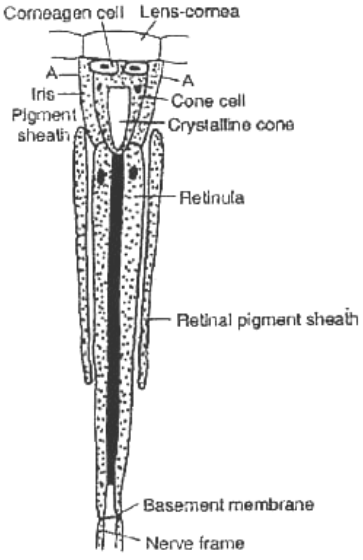

Fig. L.S. Ommatidium

326. How many Terga are visible in male cockroach

(a) 9 (b) 10
(c) 8 (d) 7

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : The body of cockroach is covered by exoskeleton called sclerites . The sclerites on the dorsal surface is knowns as tergum or terga, sclerites on vertral side is sterum on stera and 2 lateral sclerites are pleurons on pleura. There are 10 tergal plates. The 8th tergum in the male and both 8th & 9th terga in the femare are not visible as they are overlapped by the 7th tergum.

• Nine terga are visible in male cockroach. Hence the correct answer is 'nine'.

327. True coelom of cockroach occurs ____

(a) Around gonads (b) Around heart
(c) In thorax (d) Below heart

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : True coelom of cockroach occurs the gonads.

• Cockroach a schizocoelomates that is true coelomates, which is situated in the body cavity and helps in the food digestion properly.

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328. Which of the following characteristics is incorrect with respect to cockroach?

(a) 10th abdominal segment in both sexes, bears a pair of anal cerci

(b) A ring of gastric caecae is present at the junction of midgut and hind gut

(c) Hypopharynx lies within the cavity enclosed by the mouth parts

(d) In females, 7th-9th sterna together form a genital pouch

NEET-2021

Ans. (b) : Point (b) is incorrect because gastric or hepatic caeca are present at the junction of the foregut and midgut. They are ring-shaped 6 to 8 blind tubules, which releases digestive juice.

- Hypopharynx lies within the cavity enclosed by mouth parts.
- In female Cockroach, the 7th sternum is boat shaped and together with the 8th and 9th sterna forms a genital pouch.
- 10th abdominal segment in both sexes, bears a pair of anal Cerci and 9th sternum only in male Cockroach, bears a pair of Chitinous anal style.

329. Efferent salivary ducts in Periplaneta open into

(a) stomach (b) base of pharynx

(c) base of hypopharynx (d) base of oesophagus

TS EAMCET-28.09.2020 Shift-II

AP EAMCET-2007

Ans. (c) : The efferent salivary duct opens at the base of the hypopharynx, which is situated on the floor of the buccal cavity. The gland secrete digestive enzymes which are stored in reservoir till they are required for digestion of food.

330. Match the following:

	Column – I		Column – II
a.	Testis in males	p.	$4^{th} – 6^{th}$ abdominal segments
b.	Mushroom shaped gland	q.	$6^{th} – 7^{th}$ abdominal segments
c.	Ovaries in females	r.	$2^{nd} – 6^{th}$ abdominal segments
d.	Anal cerci	s.	10th segment

(a) (a – p), (b – r), (c – q), (d – s)

(b) (a – q), (b – p), (c – r), (d – s)

(c) (a – p), (b – q), (c – r), (d – s)

(d) (a – s), (b – q), (c – r), (d – p)

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : Testis in males – 4th-6th abdominal segments
Mushroom shaped gland – 6th-7th abdominal segments
Ovaries in females – 2nd - 6th abdominal segments
Anal cerci – 10th segment

331. Match the following related to cockroach

	List-I		List-II
A.	Pronotum	I.	Nervures
B.	Tarsus	II.	Intima
C.	Wings	III.	Tergum of thorax
D.	Trachea	IV.	Ligula
		V.	Plantulae

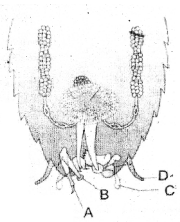
The correct match is:

	A	B	C	D
(a)	III	IV	I	II
(b)	III	V	I	II
(c)	II	I	V	III
(d)	IV	I	II	III

TS EAMCET-28.09.2020 Shift-II

Ans. (b) : Pronotum → Tergum of thorax
Tarsus → Plantulae
Wings → Nervures
Trachea → Intima

332.



Find out the pseudopenis in the above diagram

(a) A (b) B

(c) C (d) D

TS EAMCET-28.09.2020 Shift-II

Ans. (b) : A pseudopenis is any structure found on an animal that while superficially appearing to be a penis, is derived from a different developmental path. A pseudo penis is present in left phallomere which help in copulation.

- On the left side of titilator, there is a shorter and broader arm ending in a black hammer-like head called pseudopenis.

333. Match the following :

Cells of corpora adiposa of cockroach	Function
(A) Trophocytes	I. Symbiotic bacteria
(B) Mycetocytes	II. Store uric acid
(C) Oenocytes	III. Intra cellular digestion
(D) Urate cells	IV. Secrete lipids
	V. Store food

The correct match is

Options:

	A	B	C	D
(a)	V	III	IV	II
(b)	IV	III	II	I
(c)	V	I	IV	II
(d)	II	IV	I	V

TS EAMCET-15.05.2016

TS EAMCET-28.09.2020 Shift-I

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Ans. (c) : Trophocytes → Store food
Mycetocytes → Symbiotic bacteria
Oenocytes → Secrete lipids
Urate cells → Store uric acid

334. In cockroch, ootheca around the eggs is secreted by
(a) Utricular majors (b) Phalic gland
(c) Collaterial glands (d) Utricular breviores

TS EAMCET-28.09.2020 Shift-I

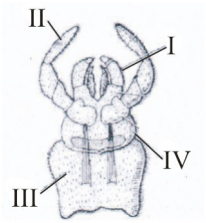
Ans. (c) : The ootheca is formed when collateral glands secrete onto the inner surface of the vestibulum.
• Phallic glands, utricular majors and utricular breviores are present in male reproductive system.

335. Triangular joint in the leg of Periplaneta is
(a) Coxa (b) Trochanter
(c) Tibia (d) Tarsus

TS EAMCET-28.09.2020 Shift-I

Ans. (b) : The parts of the legs of a cockroach are the coxa, trochanter, femur, tibia and then the tarsus. The coxa is the upper part of the leg. The coxa region helps to connect the leg to the thoracic region of the body.
• Then comes the trochanter which acts as the knee of the cockroach.
• Femur is the largest region of the leg. Tibia of an insect is slender in comparison to the femur but is generally longer than femur.

336. Observe the following diagram of labium of cockroach and pick up the correct set of labelling:



	I	II	III	IV
(a)	Paraglossa	Labial palp	Sub mentum	Mentum
(b)	Glossa	Maxillary palp	Mentum	Pre mentum
(c)	Pre mentum	Antenna	Sub mentum	Mentum
(d)	Galea	Lacinia	Stipes	Cardo

TS EAMCET-29.09.2020 Shift-I

Ans. (a) : Paraglossa → Labial palp → Sub mentum → Mentum

337. Choose the correct option regarding the following statements
Statement 1-Both males and females bear a pair of short, thread like anal styles
Statement 2- Only in males 10th segment bears a pair of jointed filamentous structures called anal cerci.
(a) Both statements are correct
(b) Only statement 1 is correct
(c) Only statement 2 is correct
(d) Both are wrong

AP EAMCET-24.09.2020 Shift-II

Ans. (d) : Male cockroach has a pair of short, thread-like anal styles arising from the 9th abdominal segment that are absent in females.
• The 10th segment bears a pair of jointed filamentous structures called anal cerci in both the sexes.

338. Arthrodial membrane in cockroach_____
(a) Connect thorax with abdomen
(b) Joins sclerites together
(c) Found on compound eye
(d) Helps to walk on smooth surface

AP EAMCET-24.09.2020 Shift-II

Ans. (b) : In cockroaches exoskeleton of each segment consist of four chitinous plates called sclerites, the adjacent sclerites are joined together by thin, soft arthrodial membrane to allow free movement.

339. Identify the incorrect statement about morphology of cockroach.
(1) Head is formed by the fusion of six segments
(2) A pair of thread like antennae arises from membranous sockets lying in front of eyes
(3) Tegmina are opaque dark and leathery and cover the hind wings, also helps in flight
(4) In females, the 7th sternum is boat shaped and together with the 8th and 9th sterna form a brood pouch
(a) 1 (b) 2
(c) 3 (d) 4

AP EAMCET-25.09.2020 Shift-I

Ans. (c) : In the case of cockroaches, the fore wings (mesothoracic) are not used for flight as they are thick, opaque and leathery, they only cover and protect the hind wings. They are also called tegmina.
• A pair of antennae is present in cockroaches. These arise from membranous sockets lying in front of eyes.
•Each antenna is made up of segments called podomeres.
• Brood or genital pouch contains female gonopore, spermathecal pores and collaterial glands.

340. If the head of cockroach is removed, it may live for few days because
(a) the cockroach does not have nervous system.
(b) the head holds a small proportion of a nervous system while the rest is situated along the ventral part of its body.
(c) the head holds a 1/3rd of a nervous system while the rest is situated along the dorsal part of its body
(d) the supra-oesophageal ganglia of the cockroach are situated in ventral part of abdomen.

NEET-2020 Phase-I

Ans. (b) : If the head of cockroach is cut off, it will still be alive for as long as one week, because the head holds a bit of a nervous system while the rest is situated along to ventral part of the body.
• This is the reason Cockroach may live for few days even after removal of the head from the body.

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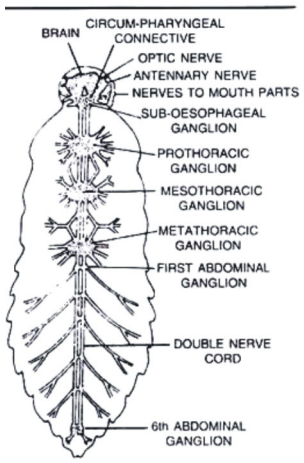


Nervous system of cockroach

341. In cockroach, identify the parts of the foregut in correct sequence:

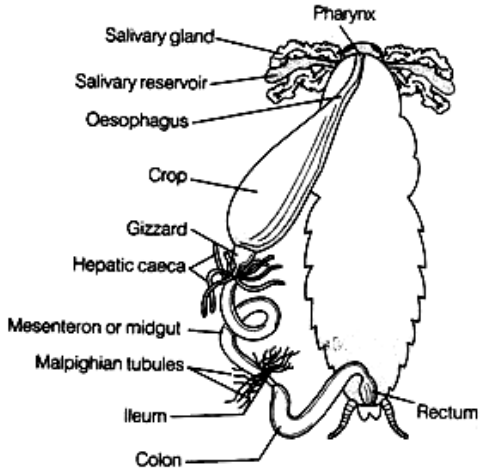
(a) Mouth → Pharynx → Oesophagus → Crop Gizzard
(b) Mouth → Oesophagus → Pharynx → Crop Gizzard
(c) Mouth → Crop → Pharynx → Oesophagus → Gizzard
(d) Mouth → Gizzard → Crop → Pharynx → Oesophagus

NEET-2020 Phase-II
NEET-2019

Ans. (a) The parts of the foregut in correct sequence is given below-

Mouth → pharynx → Oesophagus → crop → Girrard

- The alimentary canal of the cockroach is divided into three regions: foregut, midgut and hindgut.
- The foregut is start with the mouth. The food particle is ingested through the mouth, which leads to the pharynx, a small tube - like structure. It connects to another tube -like structure called the oesophagus.
- This leads to a large sac-like structure known as a crop (Here, the food is stored prior to digestion). A small cup-like structure beneath the crop is known as the gizzard.



Alimentary canal of cockroach

342. Match the following columns with reference to cockroach and select the correct option:

	Column – I		Column – II
A.	Grinding of the food particles	i.	Hepatic caecal
B.	Secrete gastric Juice	ii.	10th segment
C.	10 pairs	iii.	Proventriculus
D.	Anal Cerci	iv.	Spiracles
		v.	Alary muscles

(a) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(b) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)
(c) (A)-(iv), (B)-(iii), (C)-(v), (D)-(ii)
(d) (A)-(i), (B)-(iv), (C)-(iii), (D)-(ii)

NEET-2020 Phase-II

Ans. (b) :

(A)	Grinding of the food particles	(iii)	Proventriculus
(B)	Secrete gastric Juice	(i)	Hepatic caeca
(C)	10 pairs	(iv)	Spiracles
(D)	Anal cerci	(ii)	10th segment

343. Alary muscle is associated with

(a) heart and circulation
(b) Malpighian tubules and excretion
(c) trachea and respiration
(d) None of the above

TS EAMCET-08.05.2019 Shift-I
TS EAMCET-02.05.2018 Shift-II
UP CPMT-2002

Ans. (a) : Alary muscle is associaated with heart and circulation or pericardial sinus of the cockroach. The alary muscels are 12 pairs in number. It helps in the alternate conteractin and relaxation of the heart.

344. Which of the following statements are true with respect to the circulatory system of *Periplaneta americana*?

A. Heart consists of 13 chambers
B. Haemolymph brings oxygen from….. and tracheae and supplies to different organs.
C. Contraction of heart chambers causes the blood to flow into aorta and from there in to sinus' of head
D. Alary muscles facilitate the flow of blood through the heart.

(a) A & B (b) A & C
(c) B & D (d) B & C

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : A cockroach has an open circulatory system and the heart is an elongated muscular tube which consist of 13 segments. The heart receives oxygenated blood from the dorsal sinus through ostia. The alary muscles hold the heart in position. Presence of aorta and veins is not seen in circulatory system of cockroach.

345. The cells of fat body of cockroach which contain symbiotic bacteria are

(a) Mycetocytes (b) Trophocytes
(c) Oenocytes (d) Urate cells

TS EAMCET-08.05.2019 Shift-II

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Ans. (a) : The cells of the cockroach's fat body that contain the symbiotic bacteria are mycetocytes.
• Mycetocytes harboring an endosymbiont species of bacteria and urocytes depositing uric acid in urate vacuoles.

346. Identify the correct sequence of flow of circulation of blood in *Periplaneta americana*

(a) Heart → head sinus → aorta→ pericardial haemocoel → perivisceral haemocoel and sternal haemocoel
(b) Heart → pericardial haemocoel → aorta→ perivisceral haemocoel and sternal haemocoel → head sinus
(c) Heart → aorta→ head sinus → perivisceral haemocoel and sternal haemocoel → pericardial haemocoel
(d) Heart → pericardial haemocoel and sternal haemocoel → pericardial haemocoel → aorta→ head sinus

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : The correct option is 'c'.
Heart → Aorta → head sinus → perivisceral haemocoel and sterna haemocoel → pericardial haemocoel.

347. Thermoreceptor sensillae of cockroach are present on

(a) Maxillary palps (b) Antennae
(c) Tarsi of legs (d) Labial palps

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Cockroach's thermoreceptor sensilla are present on the tarsus of the legs. Thermoreceptor sensilla of cockroach are located in the 1st, 2^{2nd}, 3rd segment of the tarsus of legs of cockroach.

348. In cockroach, thermo receptor sensillae are present on

(a) Maxillary palps, labial palps and antennae
(b) Labrum, maxillary and labial palps
(c) First three segments of the tarsus of legs
(d) Anal cerci

AP EAMCET-24.04.2019 Shift-I

Ans. (c) : Cockroaches are cursorial and nocturnal.
• They have 3 pairs of legs. Thermoreceptor sensilla of cockroach are located in the 1st, 2nd, 3rd segment of the tarsus of legs of cockroach.

349. Match the following

List-I		List-II	
A.	**Urate cells**	**I.**	**Discharge uric acid during copulation**
B.	**Utriculi majors**	**II.**	**Nourishes the sperms**
C.	**Utriculi breviores**	**III.**	**Storage excretion**
D.	**Phallomeres**	**IV.**	**Nitrogenous waste eliminated during moulting**
		V.	**Helps in copulation**

The correct answer is

Options :

	A	B	C	D
(a)	III	I	IV	II
(b)	III	I	II	V
(c)	I	IV	II	V
(d)	I	II	III	IV

AP EAMCET-24.04.2019 Shift-I
AP EAMCET-2014

Ans. (b) :
Urate cells → Storage excretion
Utriculi majors→ Discharge uric acid during copulation
Utriculi breviores→ Nourishe the sperms
Phallomeres→ Helps in copulation

350. Match the following which are related to cockroach

List-I	List-II
(A) Adductor muscles	**(i) Depression of wings**
(B) Dorsal longitudinal museles	**(ii) Respiration**
(C) Alary muscles	**(iii) Mandibles**
(D) Dorsoventral Muscles	**(iv) Excretion**
	(v) Blood circulation

The correct answer is

Options:

	A	B	C	D
(a)	III	II	V	I
(b)	I	III	V	II
(c)	III	I	V	II
(d)	IV	I	III	II

AP EAMCET-24.04.2019 Shift-II

Ans. (c) : Adductor muscles → Mandibles
Dorsal longitudinal muscles → Depression of wings
Alary muscles → Blood circulation
Dorsoventral muscles → Respiration

351. In cockroach:

(a) Ejaculatory duct opens in phallic gland
(b) Phallic gland stores sperms
(c) Vas deferens opens in phallic gland
(d) Phallic gland opens in left phallomere

AIIMS-26.05.2019 Shift-I

Ans. (d) : A phallic or the conglobate gland is associated with the male reproductive system of the Periplaneta (Cockroach). The duct of this gland opens near the gonopore. Its function is still not known. It is a large elongate sac-like structure that lies beneath the mushroom-shape gland and ejaculatory duct. Phallic gland opens in the left phallomere.

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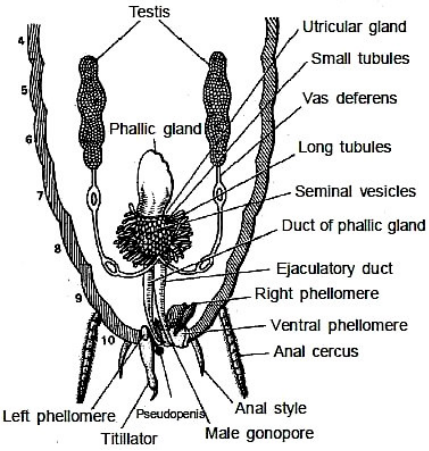


352. Choose the correct statement for Periplaneta americana

(a) It has 6 muscular hearts
(b) It has 10 thoracic segments
(c) Anal style is present in both male and female
(d) It is nocturnal and present in damp places

AIIMS-25.05.2019 Shift-I
AIPMT-1992

Ans. (d) : It is nocturnal and present in damp places is the correct statements for periplaneta americana. The cockroach has a single heart which consists of an elongated muscular tube lying along mid dorsal line of its thorax and abdomen.

- It has 3 thoracic segments namely prothorax, mesothroax and metathorax.
- Only males bear a pair of short, thread like anal styles.
- They are nocturnal omnivores which are mostly found in damp places.

353. The sense organs present on proximal parts of tibia in Cockroach are sensitive to

(a) Sound vibrations
(b) Taste
(c) Movement of flagellae of antennae
(d) Ground vibrations

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : The sense organ present on proximal parts of tibia in Cockroach are sensitive to ground vibrations.

- These sense organs are anal cerci. They are present at the end of abdomen arising from the 10th segment of the Cockroach's body.

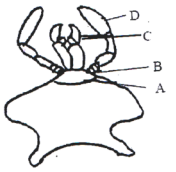
354. Statement (S) : The corpora adiposa cells perform 'storage excretion' in *Periplaneta americana*
Reason (R) : The fat body contains urate cells which absorb and store uric acid and it is the major excretory organ
Which of the following is true?

(a) Both (S) and (R)are true and (R) is the correct explanation of (S)
(b) Both (S) and (R) are true, but (R) is not the correct explanation of (S)
(c) (S) is true, but (R) is false
(d) (S) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (a) : Fat body is a lobed white structures. Urate cells present in these bodies are associated with excretion. These cells absorb and store uric acid throughout the life. This is called storage excretion as they remain stored in the cells of the corpora adipose.

355. The following schematic diagram represents the labium in the mouth parts of cockroach. Identify A, B, C and D.



(a) A-Submentum, B-Glossa, C-Labial palp, D-Palpiger
(b) A-Labrum, B-Palpiger, C-Glossa, D-Labial palp
(c) A-Palpiger, B-Glossa, C-Mentum, D-Labial palp
(d) A-Mentum, B-Palpiger, C-Glossa, D-Labial palp

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : Labium of cockroach represents the lower lip and covers the mouth from ventral side.It is made of two basal chitinous plates, mentum and sub-mentum.

- The meaning of Palpiger is the portion of the labium of an insect that bears the palpi.
- Glossa in cockroach is the part of labium.
- Labial palp:- It is formed by the fusion of second pair of maxillae.

356. In cockroach, if the sub-oesophageal ganglion is damaged, which part of the cockroach is affected

(a) Abdomen
(b) Ommatidia
(c) Wings and legs
(d) Reproductive organs

TS EAMCET-02.05.2018 Shift-I

Ans. (c) : The sub-oesophageal ganglion is the major motor center and controls the movements of the muscles, mouth parts, wings and legs. A double nerve cord arises from the sub-oesophageal ganglion that travels down the posterior and of the body through the thorax and abdomen.

357. Identify the correct statement with reference to the nervous system of the cockroach.

(p) The nervous system of cockroach is called as Autonomous nervous system.
(q) There are 3 thoracic and 6 abdominal ganglion
(r) Sub-oesophageal ganglion controls the movements of mouth parts
(s) The 6th abdominal ganglion innervates the 6th abdominal segment
The correct answer is

(a) p, s & r (b) p, q & r
(c) q, r & s (d) s & q

TS EAMCET-02.05.2018 Shift-I

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Ans. (b) : The nervous system of the cockroach consists of a series of fused, segmented ganglia that connect to paired longitudinal connectives on ventral side. Three ganglia are located in the thorax and six in the abdomen.

- The sub-oesophageal ganglion is the principal motor centre and controls the movement of muscles, mouth parts, wing and legs.
- From the 6th abdominal ganglion 3 pairs of nerves are given off to supply the 7th, 8th and 9th segment. It is also gives a branch to innervate the circus and other associated structures.

358. Cockroach is a cursorial insect and runs on the smooth surfaces using 'A' and runs on the rough surfaces using 'B' parts of the body. What are 'A' and 'B'

(a) A- Claws and arolium: B- plantulae
(b) A- Plantulae : B- Claws and arolium
(c) A- Pivot : B- Cibarium
(d) A and B- claws only

TS EAMCET-03.05.2018 Shift-I

Ans. (b) : The arolium is attached to the claws and moves with them, but the mechanical design of the pretarsus still allows some independent control of claw and arolium use depending on surface roughness.

359. The following are the joints of each leg of a Cockroach

(I) Tibia
(II) Coxa
(III) Tarsus
(IV) Femur
(V) Trochanter

Arrange them in correct sequence from thorax to tip

(a) II, I, III, IV, V
(b) II, V, IV I, III
(c) III, I, IV, V II
(d) V, IV, III, II, I

AP EAMCET-25.04.2018 Shift-I

Ans. (b) : Each leg is composed of five types of segments. The five types of segments are as follows-
(I). Coxa- It is a upper portion of the leg and attaches the leg to the thorax.
(II). Trochanter- It is the smallest segment of leg and act like knee.
(III). Femur- It is regarded as the thigh region of the leg of the cockroach.
(IV) Tibia- It resembles the shin bone as present in human leg and it is longest segment of the leg of cockroach.
(V) Tarsus- It acts like the ankle and foot of the cockroach.

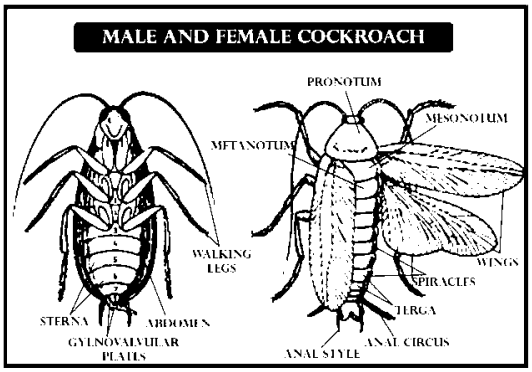
360. Which of the following features is used to identify a male cockroach from a female cockroach?

(a) Presence of a boat shaped sternum on the 9th abdominal segment
(b) Presence of caudal styles
(c) Presence of anal cerci
(d) Forewings with darker tegmina

NEET-2018

Ans. (b) : In male cockroach, the 9th segment bear a pair short, small, spine like unjointed caudal or anal style which are absent in female cockroach.

- The body of male cockroach is smaller while the body of female cockroach is relatively larger.
- The abdomen of male cockroach is slender, where as abdomen of female cockroach boat shaped.
- Antennae of male cockroach are smaller than female. Wing of male cockroach are larger where as the wings of female cockroaches are smaller.



361. In female cockroach, each ovary consists of

(a) 4 ovarioles (b) 6 ovarioles
(c) 8 ovarioles (d) 10 ovarioles

Tripura JEE-2017

Ans. (c) : The female reproductive system of cockroaches consists of two large ovaries, lying laterally in the 2-6 abdominal segments. Each ovary is made up of a cluster of eight ovarian ducts, or ovules, which contain a series of developing ovules, so there are a total of 16 ovules.

362. In female cockroach, each ovary consists of

(a) 4 ovarioles (b) 6 ovarioles
(c) 8 ovarioles (d) 10 ovarioles

Tripura JEE-2017

Ans. (c) : In female cockroach, each ovary consists of 8 ovarioles. The body of cockroach has three segments, head, thorax and abdomen. The female reproductive system consists of two large ovaries and laying laterally in the 2nd - 6th abdominal segments.

363. Statement (S) : In *Periplaneta americana* opening and closing of stigmata is influenced by CO_2 tension in haemolymph and oxygen tension in the tracheae.

Reason (R) : The air enters into tracheoles and oxygen from the air is taken into the cells and CO_2 is released into haemolymph.

(a) Both (S) and (R) are correct and (R) is the correct explanation to (S)
(b) Both (S) and (R) are correct but (R) is not the correct explanation to (S)
(c) (S) is correct but (R)is not correct
(d) (R) is correct but (S) is not correct

TS EAMCET-12.05.2017

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Ans. (a) : Air enters the system through spiracles during inspiration and comes to the trachea, then it comes to the tracheoles which contain fluids , the O_2 gets dissolved in these fluids and reaches the tissue cells. CO_2 also dissolve in hemolymph and reach the body surface which is permeable to gases and allows CO_2 to pass out.

364. Which of the following cells of cockroach secrete saliva

(a) Glandular cells of mesenteron
(b) Acinar cells
(c) Stomodaeum cells
(d) Proctodaeum cells

TS EAMCET-12.05.2017

Ans. (b) : Acinar cells of cockroach secrete saliva. It consists of water, mucus, electrolytes, and enzymes like amylase. Mesenteron is the main site of enzyme production, digestion and absorption.

365. Study the following with reference to reproductive system of Periplaneta

(I) Testes are located in 2-6 abdominal segments.
(II) Secretion of utriculi breviores forms the inner of spermatophore.
(III) In total a pair of ovaries consists of eight ovarioles.
(IV) A pair of branched colleterial glands is present behind the ovaries.

Indentify the incorrect statements :

Options:

(a) II, III, IV
(b) I, III, IV
(c) I, II, IV
(d) I, II, III

AP EAMCET-28.04.2017 Shift-II

Ans. (d) : The reproductive system of a male cockroach consists of testes vas deferens, ejaculatory duct, utricular gland and sex gland. Testes are located in 4th-6th abdominal segments. The reproductive system of a female cockroaches consist of ovaries, genital chambers, vagina, collaterial glands, external genitalia and oviducts. Each ovary is formed of a group of eight ovarian tubules or ovarioles.

• Secretion of utriculi breviores nourishes the sperms and the secretion of utriculi majors forms the inner of spermatophores.

366. Identify the Incorrect statement regarding cockroach

(a) The claws and the arolium help in locomotion on rough surfaces
(b) Plantulae are useful in locomotion on smooth surfaces which are located on tibia of legs.
(c) Mycetocytes contain symbiotic bacteria
(d) Stomodeal valve secretes peritrophic membrane

AP EAMCET-28.04.2017 Shift-I

Ans. (b) The claws and the arolium help in locomotion on rough surface while the plantulae help in locomotion on smooth surface. The distal part of tarsus generally bears the claw and is known as pretarsus. On the underside of the tarsal segments in the region of pretarsus, the plantulae is present.

367. The number of abdominal segments in male and female cockroach is

(a) 10, 10 (b) 9, 10
(c) 10, 11 (d) 8, 10
(e) 9, 9

Kerala PMT-2008

Ans. (a) : The body of the cockroach is segment and divisible The back part of the body is called abdomen. The abdomen of an adult cockroach has 10 segments (male and female) while an embryo has 11 segments. In both sexes the 10th segments bears a pair of small, filamentous and sensory anal cerci.

368. In Periplaneta, ductus ejaculatorius of male reproductive system lies in

(a) 6th segment (b) 7th segment
(c) 8th segment (d) 5th segment

AP EAMCET-2014

Ans. (b) : In periplaneta, ductus ejaculatorius of male reproductive system lies in 7th segment and cockroaches are bisexual (monoecious) animals. The male reproductive system consists of a pair of testes, vas deferens, ejaculatory duct, utricular gland and sex gland.

369. Assertion: The development in cockroach is heterometabolous metamorphosis.

Reason: The young ones resemble the adults in all.

(a) If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion
(b) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion
(c) If Assertion is true but the Reason is false
(d) If both Assertion and Reason are false.

AIIMS-1995

Ans. (c) : The development in cockroaches is heterometabolous metamorphosis. It also called gradual metamorphosis or holometaboly. Paurometabolous is the type of growth that occurs in insects such as cockroaches, which includes just three stages, i.e. egg nymph, and adult. It is called incomplete metamorphosis or parurometabolous since it lacks the pupa stage.

• The young ones resembles the adults in all reason is totally wrong, because the young insect is called the imago. It is not the same as the adult in all characters.

371. Blatta orientalis can be distinguished from periplaneta americana in that the female of Blatta is with

(a) smaller wings (b) vestigeal wings
(c) large wings (d) large eyes

AIIMS-1998

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Ans. (b) : It differs from blatta in having a wider body and wings in both sexes and they can fly. Both Periplaneta Americana and Blatta orientalis are feathers of the genus. In these sections, feathers are either developed or inconspicuous. Hence, they differ in the absence of the development of a single pair.

371. The body cells in cockroach discharge their nitrogenous waste in the haemolymph mainly in the form of :
(a) Calcium carbonate
(b) Ammonia
(c) Potassium urate
(d) Urea

AIPMT (Re-Exam)-2015

Ans. (c) : The nitrogenous waste or excretory product in insects is **potassium urate**.
• It is released into the haemolymph and taken up by the cell lining malpighian tubules.
• This facilitate the absorption of urate crystals by reacting with water and carbon dioxide to form potassium, hydrogen, carbonate and uric acid.
• The former is absorbed back into the blood, while the latter it excreted out of the body in the form of crystals after water is reabsorbed completely in the rectum.
• Uric acid is least toxic and requires less water. Hence, insects, birds are uricotelic in nature.
• Urea is intermediate form, requiring optimal water for removal most mammals including human are uricotelic.

372. Two common characters found in centipede, cockroach, and crab are-
(a) Compound eyes and anal cerci
(b) Jointed legs and chitinous exoskeleton
(c) Green gland and tracheae
(d) Book lungs and antennae

AIPMT-2006

Ans. (b) : Centipede, Cockroach and crab, all belong to phylum Arthropod which are characterized by joined legs and chitinous exoskeleton. Arthropods have bilaterally symmetrical and metamerically segmented body with haemocoel and open blood vascular system.

373. Ommatidia serve the purpose of photoreception in: -
(a) Cockroach (b) Frog
(c) Humans (d) Sunflower

AIPMT-2003

Ans. (a): Ommatidia serve the purpose of photoreception in cockroach. The compound eyes of arthropods like insects, crustaceans and millipedes are composed of units called as ommatidia. An ommatidium contains a cluster of photoreceptor cells surrounded by support cells and pigments cells.
• Cockroaches have mosaic vision due to the presence of ommatidia.

374. What is not a common feature is Periplaneta and Scorpions?
(a) Excretory organs are malpighian tubules
(b) No appendages in abdomen
(c) Respiratory organs are trachea
(d) Both are mostly terrestrial arthropods

AIIMS-2014

Ans. (c) : Periplaneta or cockroaches and scorpions are of the kingdom animal and phylum arthropoda. They have many similar characteristics. The excretory organs in both are the malpighian tubules.
• Spiracles are the small openings present along the edges of the abdomen of periplaneta, through which respiratory gases are carried and from tissues via small tubes called **tracheae**. Series of vascular thin plates called a **book lungs** to serve as a respiratory organ in Scorpion.

375. Tracheae of cockroach and mammal are similar in having
(a) paired nature
(b) noncollapsible walls
(c) ciliate inner lining
(d) origin from head

AIPMT-1993

Ans. (b) : Tracheae are known to balance the pressure inside the system. It is a dense array of a network of air tubes found in the internal system. This network of transverse and longitudinal trachea equalizes pressure throughout the system and is noncollapsible wall.

376. Periplaneta has no respiratory pigment in its blood because
(a) air is conducted directly to body tissues
(b) it has haemocoelom
(c) it has anaerobic respiration
(d) it lacks blood cell in blood

Punjab MET-2006

Ans. (a) : Periplaneta has no respiratory pigment in its blood because air is conducted directly to body tissues.
•The blood (hemolymph) of cockroaches is colourless because there is no respiratory pigment in their blood. Plasma and many blood corpuscles make up the hemolymph (hemocyte).

377. The dorsal plate of skeleton found on the abdomen of cockroach is called
(a) pleuron (b) sternum
(c) tergum (d) vertex

Punjab MET-2007

Ans. (c) : The segments on the dorsal side are called tergum and those on the ventral side are called sternum.
• Cockroaches have three pairs of jointed appendages and two pairs of wings.

378. The correct arrangement of leg parts of cockroach is
(a) coxa, femur, trochanter, tibia and claws
(b) coxa, trochanter, femur, tibia, tarsus and claws
(c) coxa, tibia, femur, plantulae and claws
(d) none of the above

Punjab MET-2007

Ans. (b) : Each leg of the cockroach is consists of five parts. These parts are as follows-
• A five-jointed tarsus ending in a pair of curved claws.
• A stout and flat coxa
• An elongated femur
• A slender tibia, and
• A small trochanter

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379. Study the following statements with reference to nervous system in Periplanata

(I) The brain is mainly a sensory and an endocrine center

(II) All thoracic ganglia supply nerves to the parts of their respective segments only

(III) Sixth abdominal ganglion is the largest of all the abdominal ganglia

(IV) Frontal ganglion is connected to the ingluvial ganglion by a recurrent nerve

From the above identify the correct statements

(a) II, IV (b) II, III
(c) I, III (d) I, IV

AP EAMCET-2016

Ans. (d) : In a cockroach, the brain is represented by a supra-oesophageal ganglion which supplies nerves to the maxillary and labial palps.

• The ganglion in 7th abdominal segment is the largest of all the abdominal ganglia and probably formed by the fusion of 3 pairs of ganglia.

380. In the female cockroach the anterior wall, roof and floor of genital pouch are formed respectively by the following abdominal sterna of

(a) 7th, 8th and 9th segments
(b) 8th, 7th and 9th segments
(c) 9th, 8th and 7th segments
(d) 8th, 9th and 7th segments

AP EAMCET-2016

Ans. (a) : In females, the 7th sternum is boat shaped and joins with the 8th and 9th sternum to form a brood or genital pouch, anteriorly containing the female gonopore, spermathecal pore and collateral glands.

381. About how many times does the nymph of the *Periplaneta americana* undergo moulting before becoming an adult ?

(a) 4 (b) 2
(c) 17 (d) 3
(e) 13

Kerala PMT-2011

Ans. (e) : The young or immature form of cockroach is called nymph, The nymphs look very much like adults.
•The nymph grows by moulting up to 13 times to reach the adults form.

382. The taste receptors of cockroach are:

(a) compounds eyes
(b) campaniform sensillae
(c) palps of maxillary labium
(d) tactile hairs

DUMET-2006

Ans. (c) : The taste receptors or chemoreceptors of cockroach are plaps of maxillary labium.

• Compound eyes are involved in vision, not taste.

• Campaniform sensilla are mechanoreceptors found in exoskeleton of insects.

383. Which of the following part of Cockroach leg is attached to thorax ventrally?

(a) Trochanter (b) Claw
(c) Femur (d) Coxa

Karnataka CET-2013

Ans. (d) : The upper part of the leg, called the coxa, connects the leg to the thorax. Coxa is most swollen segment in the leg of cockroach. The trochanter acts as a knee and allows the cockroach to bend its leg.

384. Fertilized eggs of P. americana are encased in

(a) Ootheca (b) Cocoon
(c) Genital chamber (d) Phallomere

DUMET-2011

Ans. (a) : Female cockroaches produce egg cases known as oothecae.Oothecae contains many eggs and are covered with a protein substance that hardens overtime to provide protection and stability. In cockroach, the ootheca contains 16 fertilized eggs present in two rows.

• The production of ootheca is widely seen across numerous insect species for protection from parasites and other forms of predation.

385. The egg case in female cockroach is formed by the secretions of:

(a) collateral glands (b) conglobate glands
(c) mushroom glands (d) prothoracle glands

Manipal-2002
AIIMS-2000
AP EAMCET-1998

Ans. (a) : The collateral glands of the cockroach are the sexual accessory glands, present in 3rd and 4th abdominal segments of female cockroach and helps in secretion of egg case of Ootheaca. Ootheca contains 16 fertilized eggs which are enveloped by a proteinaceous secretion secreted by the colleterial gland that gradually hardens to form a strong, protective casing around the eggs.

386. How many egg are found in egg chamber of female Cockroach?

(a) 2 (b) 4
(c) 8 (d) 16

Rajasthan PMT-2002

Ans. (d) : Ootheca is a caspsule or case containing eggs In cockroaches, ootheca contains 16 fertilized eggs present in two rows (8+8).

387. Zymogenic cell is present in :

(a) corpora adipose
(b) salivary gland of Cockroach
(c) gizzard of Cockroach
(d) compound eye of Cockroach

AIPMT (Screening)-2011
Rajasthan PMT-1999

Ans. (c) : Zymogenic cell also known as chief cell or peptic cells are release pepsinogen and chymosin.

• Zymogenic cell is present in gizzard of cockroach.

• Gizzard of cockroach helps in the crushing of food and is considered to be a part of digestive system.

388. Changing of a small Cockroach into adults is known as :

(a) moulting (b) metamorphosis
(c) ecdysis (d) transformation

Rajasthan PMT-1999

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Ans. (b) : Transformation is a broad term but metamorphosis is a specific term used to define the chronological changes of larval animal to become adults. The life cycle of cockroach has 3 stage of metamorphosis (egg, nymph, adult).

389. Which of the two parts of Periplanata appear similar in structure fundamentally?
(a) Legs and maxillae
(b) Mandibles and antennae
(c) Anal cerci and wings
(d) Labrum and anal styees

Manipal-2014

Ans. (a) : Legs and maxillae are the two parts of Periplanata appear similar in structure fundamentally.
• Maxillae are paired structure present behind the mandible in mouth region. Each consists of protopodite, exopodite and endopodite. The mouth part of cockroach is biting and chewing type.
• Legs have 5 segments- coxa, trochanter, femur, tibia and tarsus. The leg of cockroach is Cursorial leg (runnig legs).

390. Conglobate gland is found in
(a) female cockroach
(b) male cockroach
(c) Anopheles mosquito
(d) Culex mosquito

Manipal-2005, 2014

Ans. (b) : Conglobate glands are present in the sixth abdominal segment of male cockroach.

391. Which of the following statements is incorrect pertaining to cockroach?
(a) Ostia have valves which allow the blood to pass only in to the heart.
(b) Thoracic and abdominal spiracles are valvular.
(c) The wall of the trachea is made with lamina propria, endothelium and taenidia.
(d) The taenidia keeps the trachea always open and prevent it from collapsing.

AP EAMCET-2015

Ans. (c) : The wall of trachea is made of three layers- outer basement membrane, middle one cell thick epithelium and inner layer of cuticle called intima, which are continuous with the cuticle of the body surface.

392. Statement (S): Respiratory system of Periplaneta is "Polypneustic" type.
Reason (R): In Periplaneta thorasic spiracles help in expiration and abdominal spiracles help in inspiration.
(a) Both (S) and (R) are correct (R) is the correct the explanation to (S)
(b) Both (S) and (R) are correct but (R) is not the correct explanation to (S)
(c) (S) is correct but (R) is wrong
(d) (S) is wrong but (R) is correct

TS EAMCET-15.05.2016

Ans. (c) : The respiratory system of Periplaneta is 'polypneustic' type because the spiracles of cockroach are in two pairs and at least 8 pair of spiracles are functional. The respiration is cockroach occurs through spiracles. During inspiration, abdominal spiracles are closed and air flows in through open thoracic spiracles during expiration air flows out open abdominal spiracles while thoracic spiracles are closed.

393. In which part of cockroach exoskeleton is invaginated:
(a) Proctodium (b) Stomodium
(c) Mesenteron (d) Both (a) and (b)

Rajasthan PMT-1995

Ans. (d) : Both stomodeum and proctodeum, being ectodermal are lined by epidermis and exoskeleton. The meserteron (midgut) is endodermal and is responsible for enzymes secretion, hydrolysis and absorption.

394. Metamorphosis in cockroach is:
(a) Complete (b) Incomplete
(c) Holometabolous (d) Absent

Rajasthan PMT-1995

Ans. (b) : Incomplete metamorphosis- a type of metamorphosis found in insects. The insect goes through 3 stage of growth: Egg- Nymph, Adult. Insects that undergo incomplete metamorphosis include grasshoppers, cicadas, cockroaches and lice.

395. Super position image formation takes place in cockroach during
(a) Dim light (b) Diffused light
(c) Bright light (d) None of these

CMC Vellore-2011

Ans. (a) : Super position images are formed in dim light and are not sharp because it is formed by overlapping of many images. It is a blurred image. The eyes of cockroach is compound eye and composed of many units called ommatidium.

396. Which of the following is absent in the mouth part of housefly?
(a) Labrum (b) Epipharynx
(c) Mandibles (d) Maxillary palps

VMMC-2004

Ans. (c) : House fly has sponging and sucking type of parts and these mouth parts are suitable for feeding on liquid food such as nectar, fruit juice etc. Mandibles are the used to crush, grasp and defend against the predators. Mandible is modified into stylets for piercing.

397. Cellulose digesting zooflagellate found in wood cockroaches is :
(a) Lophomonas (b) Trichomonas
(c) Trichonympha (d) Leishmania

Punjab MET-2005

Ans. (c) : Trichonympha helps its host to digest cellulose and in return receives a constant supply of food and shelter. Trichonympha is a cellulose-digesting zooflagellate.

398. In cockroach, the arthrodial membrane
(a) forms the hind wings
(b) covers the compound eyes
(c) forms the hypopharynx
(d) forms the tegmina
(e) joins the sclerites

Kerala PMT-2014

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Ans. (e) : Arthrodial membrane is a thin and flexible membrane that joins the sclerites. Arthrodial membrane is also known as the intersegmental membrane. Moreover, this arthrodial membrane is a flexible cuticle and it helps in providing free movement to insects like cockroaches.

399. Which one of the following is not a sensory structure in cockroach?

(a) Antennae (b) Eyes
(c) Anal cerci (d) Maxillary palps
(e) Proventriculus

Kerala PMT-2014

Ans. (e) : Antennae - one of a pair of slender, movable, segmental sensory organ on the head of insect used for sensing odors.

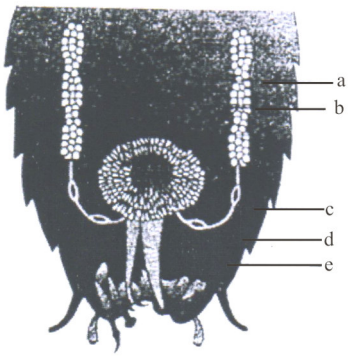
• Eyes- A compound eye is a visual organ, consist of thousands of ommatidia.

• Anal cerci- the 10th segment of the abdomen contain anal cerci serve as sensory organs but can also used for defence or mating.

Maxillary palp- These palps serve as organ of touch and taste in feeding.

Proventriculus - The opening of crop is called peritoneum/ proventriculus. It plays a role in digestion.

400. In the male reproductive system of cockroach, a, b, c, d and e represents.



(a) a-phallic gland, b-small tubules, c-vas deferens, d-ejaculatory duct, e-right phallomere.
(b) a-phallic gland, b-vas deferens, c-small tubules, d-ejaculatory duct, e-right phallomere.
(c) a-phallic gland, b-ejaculatory duct, c-vas deferens, d-right phallomere, e-small tubules.
(d) a-small tubules, b-phallic gland, c-vas deferens, d-ejaculatory duct, e-testis.
(e) a-caudal style, b-phallic gland, c-small tubules, d-vas deferens, e-ejaculatory duct.

Kerala PMT-2013

Ans. (a) : This is a diagram of reproductive system of male cockroach. In the diagram 'a' is phallic gland, 'b' is small tubules, 'c' is vas deferens, 'd' is ejaculatory duct, 'e' is right phallomere.

401. Trophocytes, mycetocytes oenocytes and urate cells are found in the fat body of cockroach. Which statement is correct?

(a) Trophocytes contain reserve food
(b) Mycetocytes contain symbiotic bacteria
(c) Oenocytes sex wax and urate cells contain uric acid
(d) All of the above

BVP-2010
CMC Vellore-2007

Ans. (d) : Trophocytes are major cells of a storage organ, the fat body from which stored glycogen and lipids are mobilized under starvation. Mycetocytes contain an endosymbiont species of bacteria. Oenocytes is the source of cuticularised war. Urocytes depositing uric acid in urate vacuoles.

402. Functionally heart of cockroach is:

(a) Neurogenic (b) Agenic
(c) Epigenic (d) Myogenic

Rajasthan PMT-1996

Ans. (a) : The heart of cockroach is neurogenic because it requires a nervous impulse to contract. On the wall of the heart, cluster of neurons is present that produces the rhythmic output for the heartbeat.

• In the neurogenic heart, present in most arthropods like cockroaches, the heartbeats are initiated by a nerve signal. Hence, the cockroach has a neurogenic heart.

403. Externally male and female cockroach can be differentiated by:

(a) Wingless condition
(b) Length of abdomen
(c) Length of maxillae
(d) Conglobate gland

Rajasthan PMT-1996

Ans. (b) : The body of male cockroach is smaller than the female cockroach's body. The body of female cockroach is relatively larger than the male body. The abdomen of the female is boot shaped and the last segments blunt. Hence, the male and female cockroach can be differentiated by length of abdomen.

404. Mushroom gland is a part of

(a) male reproductive system of cockroach
(b) female reproductive system of cockroach
(c) male reproductive system of frog
(d) aemale reproductive system of frog

UP CPMT-2010

Ans. (a) : Mushroom shaped gland are present in the male reproductive system of Cockroaches.

• It has a mass of glandular tubules of three kinds, the peripheral long tubules are utricle major, the central tubules are small short tubules or utricle herbivores and behind the shirt central tubules are some short but more bulbous tubules forming the seminal vesicles filled with sperms.

405. In cockroach, the longest podomere is

(a) Coxa (b) Tarsus
(c) Tibia (d) Femur

VMMC-2013

Ans. (c) : In cockroach, the longest pedomere is tibia. Cockroach can run and walk with their legs. The five segments of the legs are the coxa, trochanter, femur, tibia and tarsus. Coxa is short and articulates the legs with the thorax. The first four segments of the tarsus are known as tarsomeres.

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406. Which of the following cockroaches cannot fly?
(a) Male Blatta orientalis
(b) Male Periplaneta Americana
(c) Female Blatta orientalis
(d) Female Periplaneta Americana

JIPMER-1998

Ans. (c) : Blatta orientalis cockroach, female doesn't have the capacity to fly. Adult males have fully developed wings and adult females have short, triangular wing pads. Both females and males are unable to fly, but suitable answer is female Blatta orientalis.

407. Which among these is not involved in excretion in cockroaches?
(a) Malphigian tubules (b) Nephrocytes
(c) Urecose glands (d) Maxillary palps
(e) Fat body

Kerala PMT-2015

Ans. (d) : Exertion in cockroach is primarily performed by malpighian tubules. They absorb nitrogenous waste products and convert them into uric acid. Malphigian tubules situated at the junction of Malphigian tubules at the Hindgut and midgut. In addition, the fat body, nephrocytes and urecose glands also help in excretion. While the maxillary pulps are used for cleaning the antennae and also the front pairs of legs.

408. Which one of the following is the correct statement about the circulatory system of cockroach?
(a) It is closed type of circulatory system
(b) It is a complicated type of circulatory system
(c) It takes place without the participation of tissue
(d) It has 13-chambered heart and in each segment one pair of ostia are present

UP CPMT-2001

Ans. (d) : The heart of the cockroach is elongated, thick, muscular, tubular and 13-chambered.
• Cockroaches have an open circulatory system. They took blood vessels and capillaries. Dorsal sclerite is called tergum or tergite, ventral is called sternum or sternite and two lateral are called pleura or pleurisies.

409. Stink glands are present between these abdominal segments in cockroach:
(a) 4th and 5th (b) 5th and 6th
(c) 6th and 7th (d) 7th and 8th

JCECE-2008
UP CPMT-2007
AP EAMCET-2003, 2002

Ans. (b) : Stink gland is characteristic feature of cockroach that produces a fluid which help to protect it from predator. It is present between 5th and 6th abdominal segment.

410. Abdominal ganglia in cockroach are found in segments:
(a) 1, 2, 3, 4, 6 and 7 (b) 1, 2, 3, 4, 5 and 6
(c) 3, 4, 5, 6, 7 and 8 (d) 8, 9, and 10

AP EAMCET-2003

Ans. (a) : Cockroach has in total 9 ganglia in number. Out of these ganglia, 3 are present in the thorax and 6 are present in the abdomen.
• These six ganglia are present in the 1st, 2nd, 3rd, 4th, 6th and 7th segment of the nervous system of the cockroach.
• Each ganglion of the nerve cord is formed by the fusion of two ganglia except the ganglion in the 7th abdominal segment is the largest of the all the abdominal ganglia and probably formed by the fusion of 3 pairs of ganglia.

411. The lateral sclerite in cockroach is called as:
(a) palpiger
(b) arthrodial membrane
(c) pleuron
(d) pellicle

AP EAMCET-2004

Ans. (c) : Lateral sclerite in cockroach is called pleuron. It is a parts of exoskeleton of cockroach which protect the body and prevent loss of water from body.
• Dorsal surface of exoskeleton covered by chitinous plate called tergum.
• Ventral surface of exoskeleton covered by sternum.
• Tergum and sternum connected with the help of pleuron in lateral side.

412. Moulting hormone is secreted by :
(a) corpora cardlacum
(b) prothoracic gland
(c) corpora allata
(d) neurosecretory hormone

Haryana PMT-2005

Ans. (b) : Moulting hormones (ecdysones) are a group of steroid hormones, found in insects and crustacean, which are responsible for maintenance of the normal moulting, growth and maturation pattern. It is a steroid hormone secreted by prothoracic gland that in its active form, stimulates metamorphosis and regulates melting in insects.

413. Hepatic caecae in cockroach are derived from :
(a) crop (b) ileum
(c) midgut (d) gizzard

JIPMER-2000

Ans. (c) : The hepatic caecae is present at the junction of the foregut and midgut of the cockroach. The midgut is the middle part of the digestive system of cockroaches. It is responsible for the digestion and absorption of food. Their function is to secrete the digestive juices to facilitate digestion.

414. Alary muscles of cockroach are associated with
(a) Malpighian tubules and excretion
(b) trachea and respiration
(c) heart and circulation
(d) None of the above

AMU-2008
VMMC-2008

Ans. (c) : Alary muscles are a pair of triangular fans like muscles in the heart of the cockroach. The contraction and relaxation of alary muscle regulate the blood flow. This helps in the circulation of the hemolymph in the body of cockroach.

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415. Reduced, functionless mandibles present in:
(a) mosquito (b) cockroach
(c) butterfly (d) bed bud
AP EAMCET-2001

Ans. (c) : Few adult Lepidoptera lack mandibles, with the remaining mouthparts forming an elongated sucking tube.
• The exception is the mandibulate mouth (family micropterigidae). Which have fully developed mandibles an adults.

416. The endoskeleton in the head of cockroach is known as
(a) notum (b) pleura
(c) apodeme (d) tentorium
CG PMT-2011

Ans. (d) : The endoskeleton in the head of cockroach is known as tentorium. The tentorium is formed by the tube-like shaped in word extension which are the part of the exoskeleton.

417. The number of valves in the gut of cockroach is:
(a) 4 (b) 3
(c) 2 (d) 1
AP EAMCET-2000

Ans. (c) : The number of valves in the gut of cockroach is 2.

418. The palpiger of cockroach bears:
(a) labial palp (b) submentum
(c) ligula (d) labrum
AP EAMCET-2000

Ans. (a) : **Labium**: it is also called a lower lip. It covers the mouth from the ventral side. It has palpiger, a lateral appendage of the mentum and the ligula, and bearing the labial palp.
Labrum: It is also called as upper lip. It helps in holding the food and protecting the mouth.

419. In Periplaneta the cuticular lipid is secreted by :
(a) hypudermal cells (b) oenocyte cells
(c) dermal gland cells (d) basal cells
Rajasthan PMT-2000

Ans. (b) : Periplaneta the cuticular lipid is secreted by oenocyte cells.
• Oenocytes are involved in lipid processing and detoxification and secrete wax.

420. Which one of the following mouth parts arc found in Cockroach ?
(a) Cutting and chewing
(b) Piercing
(c) Sucking
(d) Drilling
Rajasthan PMT-2000

Ans. (a) : Cockroaches have cutting and chewing type of mouth parts that help in biting and chewing of food.
• The mouth parts include labrum, labium, mandibles, maxilla and hypopharynx.

421. In cockroach, the female genital pore is located at:
(a) between 9-10 terga
(b) in the centre of 8th sternum
(c) between 9-10 sternum
(d) below 10th sternum as between paraprocts
AP EAMCET-1999

Ans. (b) : In cockroach the female genital pore is located at in the centre of 8th sternum.
• In females, the 7th sternum is boat shaped and together with the 8th and 9th sterna forms a brood or genital pouch whose anterior part contains female gonopore, spermathecal pores and collateral glands.

422. The pincer like structures present on the stipes of maxilla of cockroach are:
(a) galea (b) cardo
(c) lacinia (d) para glossa
AP EAMCET-1999

Ans. (c) : Marillary palpifer is present on the stripe.
• There are two lobes present on stripe namely an outer galea and inner lacinia.

423. Haemolymph of cockroach contains
(a) erythrocytes and plasma
(b) respiratory pigments only
(c) haemocytes, leucocytes and plasma
(d) haemocytes and plasma
JCECE-2015

Ans. (d) : The haemolymph of cockroach is composed of colourless plasma and numerous types of haemocytes.
• Cockroaches, like other insects have an open circulatory system and their blood is also known as haemolymph.

424. Mouth part type in mosquito is
(a) sucking and piercing type
(b) biting and chewing type
(c) sponging type
(d) None of the above
CMC Ludhiana-2010

Ans. (a) : Mosquitoes have mouthparts that are used for piercing and sucking. The piercing and sucking mouthparts are peculiar characteristics of mosquito because they are adapted for piercing the tissues of the animal in case of female mosquitoes or plant to suck blood or plant juice in case of male mosquitoes.

425. Which is the cutting organ in the mouth parts of cockroach ?
(a) Labium (b) Maxillary palp
(c) Mandible (d) Labrum
Karnataka CET-2012

Ans. (c) : The mouthparts of the cockroach include labrum mandibles, maxillae and labium. Mandibles, is the cutting organ in the mouth parts of cockroach.
• Mandibles also work as grinding and mixing. The inner margins of mandibles have teeth like structure. Each mandibles has two types of teeth.

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426. Cockroaches can climb smooth or steep surfaces due to the presence of adhesive pads found on the tarsus of their legs. They are called……

(a) Tibia (b) Plantulae
(c) Arolium (d) Pretarsus

Karnataka CET-2010

Ans. (c) : Cockroaches can climb smooth or steep surfaces due to the presence of adhesive pads found on the tarsus of their legs. They are called arolium. They possess smooth flexible pads found at the distal end of the leg on the tarsus. The first four segments of the tarsus contain pads called as the euplantula, while the most flexible fifth segments found at the distal end of the tarsus and is called as the pretarsus.

427. Which one of the following is the true description about an animal concerned?

(a) Rat - Left kidney is slightly higher in position than the right one
(b) Cockroach - 10 pairs of spiracles (2 pairs on thorax and 8 pairs on abdomen.
(c) Earthworm - The alimentary canal consists of a sequence of pharynx, oesophagus, stomach, gizzard and intestine
(d) Frog - Body divisible into three regions-head, neck and trunk

AIPMT-2008

Ans. (b) : There are 10 pairs of spiracles in cockroach. Two pairs are thoracic in which **first pair** is known as **mesothoracic**, lying infront of the mesothorax between the bases of first and **second pair** of legs and are the largest. The second pair is called **metathoracic**.

• Abdominal spiracles are eight pairs. The first pair is dorsal in position and lies on the lateral margins of the first abdominal tergum. The remaining are situated on the sides of their corresponding segments in the pleura between the terga and sterna.

• **Spiracles** are mean for intake of fresh air and release of foul air.

428. Six highly chitinous plate-like teeth are found in ..... of cockroach

(a) mandible (b) gizzard
(c) mexilla (d) rectum

JIPMER-2014

Ans. (b) : Six highly chitinous plate-like teeth are found in gizzard of cockroach.

• The gizzard is short muscular organ that has chitin in form of proventicular teeth. These teeth serve to facilitate food grinding.

429. Arrange the ganglia of autonomous nervous system of cockroach in correct sequence from anterior to posterior end.

(A) Frontal ganglion
(B) Proventricular ganglion
(C) Hypocerebral ganglion
(D) Visceral ganglion

(a) A–C–D–B (b) A–D–C–B
(c) B–C–D–A (d) B–D–A–C

AP EAMCET-2013

Ans. (a) : (a) Frontal ganglion- This is small median ganglion located dorsally upon the pharynx just in front of the brain.

(c) Hypocerebral ganglion- This is also a small median ganglion located dorsally upon the oesophagus behind the brain.

(d) Visceral ganglion- This is located mid-dorsally upon the crop at about its middle.

(b) Proventricular ganglia- Last ganglia in the nervous system. It is present on the gizzard.

430. In Periplanata, two pair of wings are parts of thorax, these exoskeleton (I and II pair of wings) of insect arise from

(a) Mesothorax and prothorax respectively
(b) Prothorax and mesothorax respectively
(c) Mesothorax and metathorax respectively
(d) Metathorax and mesothorax respectively

UP CPMT-2014

Ans. (c): In cockroach exoskeleton (1st and 2nd pairs of wings) are part of thorax. These parts of exoskeleton in insects arise from mesothorax and metathorax respectively.

431. Which of the following features is not present in *Periplaneta americana*

(a) Metamerically segmented body
(b) Schizocoelom as body cavity
(c) Indeterminate and radial cleavage during embryonic development
(d) Exoskeleton composed of N-acetylglucosamine

NEET-2016 Phase-I

Ans. (c) : *Periplanata americana* is the American cockroach. Shows spiral and determinate types of cleavage during embryonic development. Indeterminate and radial cleavage is a features of deuterostomes while cockroach is an example of protostomes.

432. The sclerite that covers the top to the head and the space between the two compound eyes in Periplaneta is :

(a) clypeus (b) labrum
(c) vertex (d) genae

AP EAMCET-2006

Ans. (c) : The sclerite that covers the top to the head and the space between the two compound eyes in Periplaneta is vertex. Labrum represents upper lip attached with clypeus.

433. What will you look for to identify the sex of the following ?

(a) Male shark – Claspers borne on pelvic fins
(b) Female Ascaris – Sharply curved posterior end
(c) Male frog – A copulatory pad on the first digit of the hind limb
(d) Female cockroach – Anal cerci

AIPMT (Screening)-2011

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Ans. (a) : The male shark have claspers bone which is present on the inner margins of pelvic fins. Clasper help in the copulation.
- During the copulation semen release through the clasper into female shark through cloaca.
- Female Ascaris possess straight and blunt posterior end.
- Copulatory pad is present on first digit of forelimb in male frog.
- Anal cerci are present in both male and female cockroach while anal style is present only in the male cockroach.

434. The cells, present in the fat bodies of cockroach, which contain symbiotic bacteria that synthesise amino acids are
(a) Trophocytes (b) Mycetocytes
(c) Oenocytes (d) Urate cells

AP EAMCET-2010

Ans. (b) : Mycetocytes are the cell present in the fat bodies of cockroach which contain symbiotic bacteria that synthesis amino acid.
- Trophocytes contain reserve food in the cockroach and help during starvation.
- Oenocytes are involved in lipid processing and detoxification and secrete wax.
- Urate cells are present in cockroaches which contains uric acid.

435. In cockroach, the thermo-receptor sensilla are present on
(a) Antennae, maxillary and labial palps
(b) Labrum, maxillary and labial palps
(c) First, second and third tarsomeres of tarsus
(d) Anal cerci and pedicel of antennae

AP EAMCET-2010, 2007

Ans. (c) : Thermo-receptor sensilla are located in the 1st, 2nd, 3rd segment of the tarsus of legs of Cockroach.
- **Antennae** have sensory appendage that generates the olfactory, gustatory, thermal and humidity senses.
- **Maxillary palp** has a long micro-furrow near the ventral edge of the medial surface of the fifth segment, which has a high population density of 73,700 sensilla/sq. mm^2.
- **Labrum** is the flap-like structure that lies immediately in front of the mouth. It is the upper lip of the cockroach's mouth.
- **Labial palps –** One of the pair of jointed, sensory structure carried on the labium of the mouth of an insect.
- **Anal cerci** are a pair of appendages present at the end of the abdomen and function by detecting vibration and are wind sensitive.
- **Pedicel of antennae –** The three basic segments of the typical insect antenna are the scope or scapus, the pedicel and finally flagellum.

436. Note the following
(A) Monocytes (B) Trophocytes
(C) Lymphocytes (D) Mycetocytes
(E) Leucocytes (F) Oenocytes
(G) Urate cells
Which of the above are fat cells in Periplaneta?
(a) A, C, E and H
(b) B, D, F and G
(c) C, E, F and G
(d) A, C, E and F

AP EAMCET-2009

Ans. (b) : Fat body present in the haemocoel of arthropods function like liver of vertebrates. It consists trophocytes for storage of food, mycetocytes for synthesis of glycogen, amino acids, vitamins etc. Oenocytes produce moulting hormone and also involved in intermediary metabolism. Urate cells pickup nitrogen wastes and convert them into uric acid.

437. In cockroach, which of the following is the principal motor centre?
(a) Supraoesophageal ganglia
(b) Suboesophageal ganglia
(c) Metathoracic ganglia
(d) Abdominal ganglia

AP EAMCET-2009

Ans. (b) : The sub - oesophageal ganglion is the principle motor centre and controls the movements of muscles, mouth parts, wings and leg.
- The brain part of cockroaches is made up of oesophageal ganglia.

438. Note the following
(A) Fenestra (B) Pedicel (C) Lacinia
(D) Flagellum (E) Galea (F) Mentum
(G) Palpifer (H) Cardo (I) Glossa
Which of the above found in the first pair of maxillae in case of cockroach ?
(a) C, E, G and H (b) A, C, E and I
(c) A, F, G and I (d) B, E, G and I

AP EAMCET-2009

Ans. (a) : The first maxillae of cockroach has biramous structure, with protopodite containing **cardo** as its basal portion along with stipes articulated at 90°. Stipes bear a jointed expedite or maxillary palp towards out side, its basal podomear called **palpifer** and endopodite towards inside, with two closely placed podomears called **galea** and **lacinia**.

439. Male and female cockroach is differs due to presence or absence of
(a) anal cerci and anal style
(b) anal cerci
(c) anal style
(d) anal sitae

UP CPMT-2006

Ans. (c) : Male and female cockroach is differs due to presence or absence of and style.
- The body of female cockroach is relatively larger than the male.
- The abdomen of female cockroach is boat- shaped and the last segment is blunt.
- The wings of female cockroach are smaller than that of the males and extend up to the tip of the abdomen.
- The antennae of female cockroach are relatively larger than that of the male
- Only a pair of anal cerci is present in female cockroach.

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440. Organ of mastication in cockroach is

(a) labrum (b) labium
(c) mandibles (d) maxilla

Rajasthan PMT-2005
UP CPMT-2002

Ans. (c) : Mandibles are provided with teeth like structure and are used to masticate the food which helps in easy digestion. Mandibles are a pair of short structures present on either side of the mouth.

441. With reference to cockroach, match the following

	List-I		List-II
(A)	Ocellar spot	(I)	Genae
(B)	Epicranial plates	(II)	Mandibles
(C)	Cheek sclerites	(III)	Fenestra
(D)	Second maxillae	(IV)	Vertex
(E)	Adductor and abductor muscles	(V)	Labium

The correct match is

(a) A-III, B-V, C-I, D-IV, E-II
(b) A-II, B-IV, C-III, D-V, E-I
(c) A-II, B-V, C-I, D-IV, E-III
(d) A-III, B-IV, C-I, D-V, E-II

TS EAMCET-2015

Ans. (d) : Ocellar spot — Fenestra
Epicranial plates — Vertex
Cheek sclerites — Genae
Second maxillae — Labium
Adductor and abductor muscles — Mandibles

442. The number of heart chambers found in cockroach is

(a) 4 (b) 7
(c) 5 (d) 13

UP CPMT-2009
Punjab MET-2009

Ans. (d) : The heart of the cockroach is a long tube like structure. It lies along the mid dorsal line of the throax and abdomen. It is 13 chambered organs and the opening of each chamber into other chamber is guarded by valves.

H. Frogs

443. In which animal diaphragm has no role in respiration?

(a) Frog (b) Rat
(c) Camel (d) Rabbit

AP EAMCET-25.09.2020 Shift-II
HP CET-2012
AMU-2005
Manipal-2003
VMMC-2004
AP EAMCET-1998
BVP-2005

Ans. (a) : Diaphragm has no role in the respiration in frog but in mammals it increase the surface area for respiration.
• Frog is a member of a diverse and largely carnivorous group of short-bodied, tailless amphibians composing the order Anura.

444. Bidders canal is present in

(a) male rabbit (b) male frog
(c) female frog (d) both (b) and (c)

JCECE-2014
AP EAMCET -2011
Rajasthan PMT-2009
Punjab MET-2009
UP CPMT-2009
UP CPMT-2006

Ans. (b) : The bidder canal is located in the male frog's kidney. Vasa efferentia opens into the Bidder's canal and the Bidder's canal is connected to longitudinal collecting tubules, by means of a number of transverse collecting ducts and helps in the passing of the sperms.

445. Different colour of frog skin are controlled by

(a) hormones (b) melanocytes
(c) nervous system (d) Both (a) and (c)

JCECE-2012, 2014
BVP-2012
Uttarakhand PMT-2008
Manipal-2008
MGMIS Wardha-2006
BCECE-2001

Ans. (a) : Change in colour of skin is produced by expansion of pigment in the melanophores under the influence of hormones of pituitary gland.

446. Blastula of frog has

(a) blastopore (b) blastocoel
(c) archenteron (d) gastropore

BCECE-2014
BVP-2007, 2012
Uttarakhand PMT-2008
Manipal-2005, 2008
MGMIS Wardha-2006

Ans. (b) : The process of formation of blastula is called blastulation. The blastula of frog is hollow and has a very well developed blastocoel. The blastula of frog is called amphiblastula and has fluid filled cavity.

447. In frog the vertebra, with an anterior convex surface, is:

(a) atlas (b) urostyle
(c) 8th vertebra (d) 9th vertebra

AFMC-2002
Punjab MET-2003
UP CPMT-2001
AP EAMCET – 1997,2000

Ans. (d) : The ninth vertebra is also known as sacral Vertebra. The centrum of ninth vertebra is biconvex i.e. convex, on both the sides (bearing one convexity anteriorly and two convexities posteriorly).

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448. The egg of frog is :

(a) Telolecithal (b) Microlecithal
(c) Alecithal (d) Centrolecithal

AMU-2005
Uttarakhand PMT-2004
Manipal-2000, 2004
Rajasthan PMT-2000, 2004
Punjab MET-2004
BVP-2001

Ans. (a) : An egg that has a large quantity of yolk, where the yolk is unevenly distributed all through the cytoplasm, is referred to as telolecithal egg. The yolk in this type of egg is concentrated more towards the vegetal pole.

449. Functional kidney of frog tadpole is :

(a) archipheros (b) pronephros
(c) mesonephros (d) metanephros

Manipal-2011
HP CET-2011
BVP-2003
VMMC-2005
AMU-2004

Ans. (b) : The pronephric kidney is the most primitive type of kidney. It opens into the body cavity and functional unit is ciliated funnel or nephrostomes. For example - Tadpole of the Frog, Pronephros are the functional kidney of a frog tadpole. Pronephric cells of the tadpole undergo apoptosis and their function is replaced by mesonephros which becomes the functional kidney of the adult frog.

450. Mesonephric kidney are

(a) excretory organs of insects
(b) excretory organs of frog
(c) respiratory organs of insects
(d) endocrine glands of insects

UP CPMT-2012
HP CET-2013
BCECE-2001
Haryana PMT-2001
AIPMT-1997

Ans. (b) : Mesonephric kidney are excretory organs of frog. Excretion is via kidneys, and kidneys are mesonephric and adult amphibians are ureotelic.

451. Metamorphosis of Frog from tadpole to adult is controlled by :

(a) adrenalin (b) thyroxin
(c) secretin (d) insulin

Manipal-2005
Rajasthan PMT-2001
AIIMS-1999
DUMET-2005
UP CPMT-2003

Ans. (b) : Metamorphosis of frog from tadpole to adult is controlled by thyroxin. In frogs, thyroid secretion stimulated the metamorphosis from tadpole to adult frog.

452. In frog heart, there are cardiac muscles which consists of fibres called

(a) Purkinje fibres (b) myonemes
(c) telodendria (d) columnae carnae

VMMC-2012
UP CPMT-2008, 2012
CG PMT-2008
JIPMER-2009

Ans. (a) : The frogs heart is made up of three chambers, one ventricle and two atria. The Purkinje fibres are special conducting fibres consisting mainly of electrically excitable cells that are larger than cardiomyocytes with less myofibril and more mitochondria and that perform cardiac action potentials faster and more effectively than any other heart cells.

453. Statements I: In frog, buccopharyngeal cavity acts as a force pump during pulmonary respiration.
Statement II: Vocal sacs and amplexy pads are formed in female frogs during breeding season.
The correct option among the following is

(a) Both statements I and II are true
(b) Both statements I and II are false
(c) Statement I is true. But statement II is false
(d) Statement I is false. But statement II is correct

TS EAMCET-11.05.2023, Shift-II

Ans. (c) : • The buccopharyngeal cavity is a chamber in the head of the frog that helps with respiration.
• During pulmonary respiration, the frog alternately contracts and relaxes the muscles of the floor of the buccopharyngeal cavity.
• Vocal sacs and amplexy pads are only formed in male frog during the breeding season.
So, the statement I is true but statement II is false.

454. Identify the functions of diencephalon in frog's brain among the following

(a) Involuntary movements and sense of smell
(b) Perception of cold and equilibrium
(c) Perception of heat, cold and integrity of autonomous system
(d) Perception of heat and sense of sight

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : The functions of diencephalon in frog's brain among the Perception of heat, cold and integrity of autonomous system. It also play a role in the regulation of body temperature, sleep and appetite.

455. The poison gland found in the skin of all frogs is called

(a) Thymus gland (b) Adrenal gland
(c) Parotid gland (d) Pituitary gland

Tripura JEE-2022

Ans. (c) : They are called parotid gland and are found behind the eyes on toads and some frogs and salamanders. In toads, these glands contain bufotoxin, which is neurotoxin.

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456. Given below are the statements regarding frog. Choose the correct statements.

(a) Frog is a carnivore, so the length of alimentary canal is short.

(b) Frog never drinks water but absorbs through skin.

(c) The ureters of frog also act as genital ducts.

(d) Frog is uricotelic animal.

Options:

(a) A, B, C only (b) A, B only

(c) A, B, D only (d) A, B, C, D

TS EAMCET-31.07.2022 Shift-I

Ans. (c) : The alimentary canal is short because frog is carnivores. Frog never drink water but absorb through skin. The ureters also act as urogenital ducts and frogs are ureotelic.

457. Assertion (A) : During pulmonary respiration in frog, buccopharyngeal cavity acts like a force pump.

Reason (R) : When the floor buccopharyngeal cavity is lowered, air forces the glottis to open and reach the lungs.

The correct option among the following is

Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)

(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : Buccopharyngeal respiration is a mode of respiration via the buccopharyngeal cavity or the mouth. In this mode, the oxygen is taken up simply by diffusion or by the contraction and relaxation of the muscles or the buccopharyngeal cavity. During this mode of respiration, when the air is being pulled in, there is closure of the nostrils, an opening of the glottis, and elevation of the buccal cavity floor.

458. Study the following regarding frog:

(I) Corpora bigemina is present in the mid brain

(II) Bidder's canal is present in the kidney of female frog.

(III) Sinus venosus is present on the ventral side of heart.

(IV) Collumella auris is present in the middle ear

The correct statement from the above are :

(a) Only I and IV

(b) Only I, II and III

(c) Only II, III and IV

(d) Only III and IV

TS EAMCET-29.09.2020 Shift-II

Ans. (a) : From above statement (i) and (iv) are correct. Bidder's canal is present is the kidney of male frog. It facilitates the conduction of sperm from the testis to water.

Sinus venosus is triangular shaped structure present in the dorsal side of the heart.

459. The skull of frog and rabbit is:

(a) dicondylic (b) monocondylic

(c) tricondylic (d) acondylic

TS EAMCET-02.05.2018 Shift-II

JIPMER-1998

Ans. (a) : The skull which is attached to the body with two articulatory condyles is dicondylic skulls. It is found in amphibians and mammals hence, the skull of frog and rabbit is dicondylic.

460. Frog heart when taken out of the body continues to beat for some time

Select the best option from the following statements

(1) Frog is a poikilotherm

(2) Frog does not have any coronary circulation

(3) Heart is "myogenic" in nature

(4) Heart is autoexcitable

(a) Only (3) (b) Only (4)

(c) (1) & (2) (d) (3) & (4)

NEET-2017

Ans. (d) : Frog's heart is myogenic and self-stimulating . • This means the contraction of heart originates within muscles itself. When muscles contract, they release heat which continues the electrochemical reactions in muscles, that enable to the heart to contract even after removal from the body.

461. Acetabulum is the cavity of:

(a) pelvic girdle of frog

(b) sternum of frog

(c) pectoral girdle of frog

(d) all of the above

BVP-2005

Ans. (a) : Acetabulum is the cavity of pelvic girdle of frog. It is formed by a combination of all three bones of the pelvis - the ileum, pubis and ischium.

462. Which one of the following is not a characteristic feature of frog?

(a) The skin is moist and slimy

(b) Each of the fore limbs and hind limbs end in five digits

(c) Hepatic portal and renal portal systems are present

(d) Skin, buccal cavity and lungs are the respiratory organs

(e) heart is three chambered

Kerala PMT-2009

Ans. (b) : Frog fore limbs end in four digits and hind limbs end in five digits. In general, frog have protruding eyes, no tail and neck, webbed hind limbs that are adapted for leaping and swimming. They also possess smooth, moist skins. Many are predominantly aquatic, but some live on land, in burrows or in trees.

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463. Presence of gills in the tadpole of frog indicates that :-
(a) Fishes evolved from frog like ancestors
(b) Frogs will have gills in future
(c) Frogs evolved from gilled ancestors
(d) Fishes were amphibious in the past

AIPMT-2004

Ans. (c) : It is universally accepted that amphibians (frogs) originated from fishes.
- Resemblance of amphibians to fish is seen in most system of body both are cold blooded. Both usually lay eggs in water.
- Tadpole are the larval form of frog they respire through gills where as adult through skin, hence the presence of gills in the tadpole indicates that frogs are evolved from gilled ancestors.

464. In the development of frog the blastopore forms the future
(a) tympanum (b) mouth
(c) nares (d) anus

AIIMS-1998

Ans. (d) : In the development of frog the blastopore forms the future anus. The blastopore expands into a circle and cell migrating through this circle become the lateral and ventral mesoderm. The cell remaining on the outside become the ectoderm and this outer layer expands vegetally to enclose the entire embryo.

465. Plica semimularis is found in
(a) kidney of mammals
(b) heart of rabbit
(c) ear of mammals
(d) eyes of frog

AIIMS-1998

Ans. (d) : Plica semimularis is found in eyes of frog. The plica semimularis is the thin upper part of the fold of mucous membrane in the supratonsillar fossa that reaches across between the two arches.
- A separate fold is called the plica, triangularis which runs inforoposteriorly from the posterior surface of the platoglossal arch to cover the inferior portion of the tonsil.

466. How do you differentiate a frog from a toad?
(a) Frog has no exoskeleton but toad has scales.
(b) Frog respires through lungs but toad respires through skin
(c) Frog has a tail but toad has no tail.
(d) Frog has no parotid glands but toad has a pair of parotid glands.

Karnataka CET-2011

Ans. (d) : Frog have long legs, compared to their head and body, which are made for jupming. Toads, on the other hand, have much shorter legs and prefer to crawl rather than hop. Frogs have smooth, somewhat slimy skin. Toads have dry, warty skin. Frog has no parotid glands but toad has a pair of parotid glands behind the tympana.

467. Acoelus vertebrae in frog is
(a) 5th vertebrae (b) atlas vertebrae
(c) 8th vertebrae (d) none of these

UP CPMT-2007

Ans. (b) : Acoelus vertebrae in frog is atlas vertebrae.
Acoelous-Type of vertebrae found in most mammals in which the ends of the centrum are flat and the vertebrae are separated by an intervertebral disc.

468. Which one of the following characteristics is common both in humans and adult frogs
(a) Nucleated RBCs
(b) Ureotelic mode of excretion
(c) Four-chambered heart
(d) Internal fertilisation

AIPMT (Mains)-2012

Ans. (b) : One of the common feature between Human and adult frog is having ureotelic mode of excretion. Most animal converts toxic ammonia into less toxic urea.
- Four chambered heart is present in human but three chambered in frog.
- Nucleated RBCs found in frog but not present in human.
- Fertilization is internal in human but external in frog.

469. In frog chromosome number is reduced half
(a) when 2nd polar body is separated
(b) when 2nd polar body is divided
(c) when 3rd polar body is separated
(d) when 1st polar body is separated

JIPMER-2005

Ans. (d) : In frog the number of chromosomes is halved when the first polar body separates. The process of oogenesis occur as meiosis I and meiosis II. In meiosis I, the diploid primary oocyte divides into two unequal haploid daughter cells known as the secondary oocyte and first polar body.

470. The ganglia of sympathetic and the central nervous system in frog develops from the
(a) Neural cell (b) Neural plate cells
(c) Notochordal cells (d) Neural crest cells.

AIIMS-2002

Ans. (d) : In frog, all nerve cells connecting to central nervous system (brain and spinal cord) with receptor and effectors constitute the peripheral nervous system.
- The ganglion is a simple relay for central nervous system output to peripheral autonomic targets.

471. Skin is an accessory organ of respiration in
(a) humans (b) frog
(c) rabbit (d) lizard

AIPMT-1990

Ans. (b) : Skin is an accessory organ of respiration in frog. The respiratory gasses diffuse through the surface of skin in frog. The skin of frog is thin and richly supplied with blood capillaries. It is kept moist by mucus and water.

472. The roof of the cranium of frog is formed by
(a) frontoparietal (b) orbitosphenoid
(c) parasphenoid (d) alisphenoid

AIPMT-1997
Haryana PMT -2000

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Ans. (a) : The roof of the cranium of frog is formed by forntoparietal.
Frontoparientals-These are a pair of flat bones that forms the dorsal part i.e. the roof of the cranium in frogs.

473. In frog, the surface of attachment of tongue is
(a) pterygoid (b) hyoid apparatus
(c) parasphenoid (d) palatine

AIPMT-1997

Ans. (b) : The hyoid apparatus provides a surface for the attachment of the tongue muscles and the respiratory muscles.
• The hyoid apparatus is located at the bottom of the oral cavity and between the two arms of the hyoid apparatus indirectly helps in the ingestion of food.

474. Bullfrog of India is
(a) *Rana tigrina* (b) R. sylvatica
(c) R. catesbeiana (d) R. esculenta

AIPMT-1992

Ans. (a) : Bullfrog of India is *Rana tigrina*. They specifically refer to the Indian bullfrog of the Asian bullfrog because of their population distribution in regions such as Bangladesh, India, Myanmar, Nepal etc.

475. Addition of a trace of thyroxine or iodine in water containing tadpoles will
(a) keep them in larval stage
(b) hasten their metamorphosis
(c) slow down their metamorphosis
(d) kill the tadpoles

AIPMT-1990

Ans. (b) : The addition of thyroxine to water will accelerate metamorphosis. Thyroxine regulates tissue differentiation and metamorphosis of tadpole larval in frogs. Gundernatch (1912) proved that the metamorphosis of tadpoles into adult frogs is controlled by thyroxine.

476. Tadpole's tail is a/an:
(a) excretory organ
(b) attachment organ
(c) respiratory organ
(d) locomotory organ

AFMC-2003

Ans. (d) : Tadpole's tail is a locomotory organ. Tadpoles have a notochord but except at the base of the tail where a few vertebral elements develop. The tadpole's tail completely lacks either osseous or cartilaginous elements.

477. Shifting of ammonotelism to ureotelism is seen in
(a) fishes (b) frog
(c) protopterus (d) snake

WB JEE-2007

Ans. (b) : Shifting of ammonotelism to ureotelism is seen in frog.In the tadpoles, the end product of nitrogen metabolism is ammonia which is easily disposed of by diffusion in water. After metamorphosis, however the frogs excrete most of their nitrogenous waste in the form of urea and only small amount as ammonia.

478. The centum in typical centrum of frog is
(a) Amphicoelous
(b) Procoelous
(c) Heterocoelus
(d) Acoelous
(d) None of the above

CMC Vellore-2015

Ans. (a) : Amphicoelous ventebrae has a centrum with a concavity on both the ends i.e the posterior and the anterior side.

479. Salivary glands are absent in:
(a) Blatta orientalis (b) Anopheles
(c) Musca domestica (d) Rana hexadactyla

AP EAMCET-1998

Ans. (d) : In Rana hexadactyla, salivary glands are absent, Blatta, Musca and Anopheles are insects in which salivary glands are present. Salivary glands lubricate your mouth, help you swallow and aid in digestion.

480. Flying frog′s scientific name is:
(a) Rhacophorus (b) Bufo
(c) Phyllobates (d) Necturus

AP EAMCET-1998

Ans. (a) : Rhacophorus is a common genus frog inhabiting Africa and South Eastern Asia. In this genus of frog, webs are much developed. That's why, it is also called "Flying Frog". Flying frog is also known as gliding frog.

481. A cup like cavity located on the each side of pectoral girdle of frog is
(a) thoracic cavity (b) acetabulum
(c) glenoid cavity (d) sigmoid arc

Manipal-2014

Ans. (c) : A cup-like cavity is situated on either side of the earlobe of the frog which is called the glenoid cavity. It is present in shoulder girdle.

482. If the size of a fertilized egg of frog is compared with the size of its blastula and gastrula stages, which of the following observation will be correct?
(a) All the three will be of the same size
(b) There is a progressive increase in size from zygote to and blastula to gastrula
(c) Gastrula will be larger, while zygote and blastula will be of same size
(d) Zygote will be smaller, while blastula and gastrula will be larger

Karnataka CET-2005

Ans. (c) : If the size of a fertilized egg of frog is compared with the size of its blastula and gastrula stages, we find that gastrula will be larger, while zygote and blastula will be of same size.

483. Grey crescent is present in:
(a) eye of frog (b) retina of cockroach
(c) brain of rabbit (d) fertilized egg of frog

Karnataka CET-2000

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Ans. (d) : Grey crescent is present in fertilized egg of frog. Grey crescent is a structure formed on the opposite side of sperm entry in a frog egg. It has a bunch of growth factors, that basically regulate, which part of the cell becomes that part of the body.

484. Food of tadpole (Frog) is:
(a) Aquatic Animals (b) Aquatic insects
(c) Eggs of fishes (d) Aquatic vegetation

Rajasthan PMT-1995

Ans. (a) : Food of tadpole (frog) is aquatic animals. The tadpole is the larval stage in the biological life cycle of an amphibian. Tadpoles have some fish-like features that can not be found in adult amphibians such as a lateral line, gills and a swim tail.

485. Fully mature larva of frog respire by:
(a) skin (b) gills
(c) lungs (d) buccal cavity

BCECE-2001

Ans. (b) : They respire with the help of gills. Only after they grow into the adult stage, most of the amphibians respire through skin and lungs.

486. Which of the following glands is present in frog's skin and not in rabbit's skin?
(a) Sebaceous gland (b) Sweat gland
(c) Mucous gland (d) Moll's gland

CG PMT-2004, 2007

Ans. (c) : Frog skin contains three different types of exocrine glands, granular (poison), mucous and seromucous. The granular gland forms a syncytial secretary compartment within the acinus, which is surrounded by smooth muscles cells. Mucous and seromucous glands are easily distinguishable as separate glands.

487. Frogs and toads belong to the order
(a) Caudata (b) Apoda
(c) Anura (d) Gymnophiona

CMC Vellore-2011

Ans. (c) : Frogs and toads belong to the order Anura. The order Anura (more than 4500 species) includes frogs and toads grouped into approximately thirty families of which Leptodactylidae, Hylidae and Ranidae are the largest. Salamanders, newts, sirens, amphiuma, waterdogs and mudpuppies comprise the order Caudate.

488. In Frog the ear has:
(a) pinna
(b) cochlea and pinna
(c) pinna and drum
(d) ear drum and internal ear

Haryana PMT-2000

Ans. (d) : In frog the ear has ear drum and internal ear. The frog does not have an external ear comparable to that of most other terrestrial vertebrates. There is no pinna and the majority of known species lack an ear canal.

489. The egg of a frog is :
(a) centrolecithal (b) macrolecithal
(c) microlecithal (d) mesolecithal

Punjab MET-2004

Ans. (d) : The egg of frog are mesolecithal. This is because their eggs contain an moderate amount of yolk. The yolk is concentrated in one area of egg (the vegetal pole). Sharks and amphibians are example mesolecithal egg.

490. Wolffian body also known as :
(a) pronephros (b) mesonephros
(c) metanephros (d) abnormal heart

Punjab MET-2005

Ans. (b) : Wolffian body also known as mesonephros. The Wolffian duct is one of the paired embryogenic tubules that drain the primitive kidney to the cloaca.

491. Choose the wrong statement regarding the circulatory system of frog
(a) Sinus venosus receives blood through major veins called vena cava
(b) The ventricle opens into a sac like conus arteriosus
(c) The erythrocytes are nucleated
(d) Special venous connection between liver and intestine called renal portal system is present
(e) Lymphatic system consists of lymph, lymph channels and lymph nodes

Kerala PMT-2014

Ans. (d) : Hepatic portal system is the special venosus connection between liver and intestine, while the connection between kidney and intestine are called renal portal system.

492. Addison of which elements in water, speed up the metamorphosis in frog tadpole larva?
(a) I_2 (b) K
(c) Na (d) C*l*

JCECE-2008

Ans. (a) : The changes in the stages from a larva to an adult are known as metamorphosis. The metamorphosis of frog is controlled by the thyroid hormones that cobntains iodine element thus addition of iodine in water speed up the metamorphosis of frog tadpole.

493. In the pectoral girdle of frog there is a cup like cavity on each side called:
(a) acetabulum (b) sigmoid arc
(c) glenoid cavity (d) thoracic cavity

Manipal-2006

Ans. (c) : The glenohumeral joint along with the humerus form this cavity. This joint form is known as a joint of the synovial, ball and socket by means of the long head of the biceps tendon, the humerus is fixed in place inside the glenoid cavity.

494. A renal portal system is found in
(a) Man (b) Frog
(c) Horse (d) Rabbit

Uttarakhand PMT-2011
BCECE-2011

Ans. (b) : A renal portal system is found in frog. Renal portal of frog drains blood from hind limbs and posterior part of the trunk and supplies to the kidneys.

495. What is the main difference between RBCs of human and frog?

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(a) Human RBCs are non-nucleated
(b) Haemoglobin is found only in human RBCs
(c) Human RBCs have nucleus
(d) Human RBCs are multi-nucleated

BVP-2010
JCECE-2004
Haryana PMT-2003

Ans. (a) : The main difference between human blood cells and frog blood cell is that human red blood cell lack nuclei whereas frog blood cells contain nuclei, because human need more oxygen than frog.

• They loss nucleus in order to accommodate more haemoglobin, so that they can transport more amount of oxygen.

496. In an egg of frog is divided in a way that one part has animal hemisphere and another part is deficient in that then:
(a) Only animal hemisphere region forms embryo
(b) Both the sites form embryo
(c) Embryo is not formed from any region
(d) Animal hemisphere deficient region forms the embryo

Rajasthan PMT-1996

Ans. (a) : The egg of amphibians are moderately telolecithal (mesolecithal). This means a large amount of yolk is concentrated at the vegetal pole and the opposite, the animal pole is metabolically more active with radial and holoblastic cleavage. Hence, in the animal hemisphere, the blastula consists of many small cells with formation of blastocoels that eventually form the embryo and in the vegetal hemisphere fewer but larger cells are present.

497. Spinal nerves in frog are
(a) 10 pairs (b) 30 pairs
(c) 12 pairs (d) 33 pairs

UP CPMT-2010

Ans. (a) : Peripheral nervous system of a frog comprises of cranial and spinal nerves. In frog there are 10 pairs of spinal nerves that arise from the side of the spinal cord. Each nerve arises by two roots, a ventral (anterior) and a dorsal (posterior), which unite at their point of exit from the vertebral canal and they emerge between vertebrae.

498. Which are of the following sets of characters are applicable in metamorphosis of tadpole larva of frog and toads?
(a) Reabsorption of gills and lengthening of tail
(b) Complex development of gill and lengthening of tail
(c) Reabsorption of gills and resorption of tail
(d) Complex development of gill and resorption of tail

VMMC-2013
J & K CET -2006

Ans. (c) : The process of transformation of larva of some vertebrates and majority of invertebrates into adult is called metamorphosis. Reabsorption of gills and resorption of tail are the characters applicable in metamorphosis of tadpole larva of frog and toads.

499. How can a tadpole be prevented to change into frog for long time ?
(a) By giving very less food
(b) By giving fat-rich food
(c) By adding lot of thyroxine to the water in which they are kept
(d) Provide them an antithyroid substance like thiourea

AFMC -2011

Ans. (d) : The anti thyroid drug like thiourea reduces the secretion of thyroxin hormones, which prevents metamorphosis of frog, because during metamorphosis thyroxin hormones change a tadpole into mature frog.

500. The following is absent in frogs heart:
(a) sinus venosus
(b) inter ventricular septum
(c) semilunar valves
(d) auriculo ventricular valves

JIPMER-1998

Ans. (b) : Inter verntricular septum is absent in frog heart.

501. The third cleavage of frogs egg is of:
(a) transverse and equal type
(b) vertical and equal type
(c) transverse and unequal type
(d) vertical and unequal type

JIPMER-1998

Ans. (c) : Cleavage is the series of mitotic divisions that divides an embryo after fertilization. The first cleavage occurs shortly after the zygote nucleus form. The third cleavage of frog egg is transverse and unequal type.

502. What type of cleavage is found in frog?
(a) Discoidal
(b) Holoblastic unequal
(c) Holoblastic equal
(d) Superficial

UP CPMT-2012, 2010
JIPMER-1997

Ans. (b) : In the frog, the cleavage is of holoblastic unequal type because of a large amount of yolk present towards the vegetal pole. It is the cleavage, which is produces unequal size of blastomeres.

503. Skin plays a very important role in osmoregulation in frog by:
(a) active outflow of water
(b) osmotic inflow of water
(c) active uptake of salts
(d) passive inward diffusion of salt

JIPMER-1997
DUMET-2001

Ans. (b) : Skin plays a very important role in osmoregulation in frog by osmotic inflow of water. It keeps skin moist and maintain the water balance.

• Water absorption across the skin is driven by osmotic gradient. The unique properties of frog skin having high permeability to water and electrolyte, therefore, allow this tissue to contribute to osmoregulation.

@apna_pdf

504. Frogs

(a) are uricotelic
(b) have olfactory lobes in the midbrain
(c) do not have renal portal system
(d) have lymphatic system
(e) have gall bladder which secretes bile

Kerala PMT-2015

Ans. (d) : Frogs are ureotelic. They have olfactory lobes in fore brain. They have renal portal system, it is a venous connection between intestine and kidney. Frog have lymphatic system. They have gall bladder which store bile and it secreted by liver.

505. V^{th} Cranial nerve of frog is called

(a) Optic nerve (b) Vagus
(c) Trigeminal (d) Ophthalmic

MGIMS Wardha-2008, 2010
UP CPMT-2006
BVP-2001

Ans. (c) : Frog's nervous system contains 10 pairs of cranial nerves that serve different purposes. The fifth cranial nerves of the frog is called the trigeminal nerve which arises from the lateral side of the medulla. It receives impulses from the skin of the snout.

506. In the development of frog, the gastrulation process involves.

(a) epiboly (b) emboly
(c) invagination (d) All of these

UP CPMT-2001

Ans. (d) : In the process of gastrulation in frog epiboly, emboly and invagination are take place. Gastrulation starts after the implantation and each germ layer (ectoderm, endoderm and mesoderm) develops into various organs of the body.

- The ectoderm of anamniotes during gastrulation cover the entire embryo is known as epiboly.
- Formation of a gastrula from a blastula by invagination of the germ layers is said to be emboly.
- During invagination, gastrulation is initiated at the future dorsal side of the embryo.

507. During hibernation period, frogs respiration is:

(a) cutaneous (b) pulmonary
(c) pharyngeal (d) buccopharyngeal

Uttarakhand-2005

Ans. (a) : Cutaneous respiration in frogs and other amphibians may be the primary respiratory mode during colder temperatures. Cutaneous respiration is the only form of respiration, which take place when the frog is under water or in hibernation. There is rich supply of blood capillaries to the skin, which are permeable to gases.

508. In frog chromosome number is reduced to half :

(a) when 2nd polar body is separated
(b) when 2nd polar body is divided
(c) when 3rd polar body is separated
(d) when 1st polar body is separated

Haryana PMT-2005

Ans. (d) : In frog, chromosome number is reduced to half when first polar body is separated and secondary oocyte is formed during oogenesis. Oogenesis is process of formation of ova. During oogenesis, secondary oocytes is formed because meiosis -I takes place in primary oocytes.

509. In frog jelly around the eggs is deposited

(a) in water after fertilization
(b) in water during fertilization
(c) in the oviduct
(d) in the ovary

AMU-2008
VMMC-2008

Ans. (c) : Frogs deposit their eggs as a clump of jelly; toads as strings. In female frog, the jelly is deposited around the egg in the oviduct. The oviducts are the tubular structures present in female frog that carry eggs from the ovaries to the cloaca.

510. Frog is

(a) ammonotelic (b) ureotelic
(c) uricotelic (d) None of these

VMMC-2008
AMU-2008

Ans. (b) : Ureotelic animals excrete nitrogenous waste in the form of urea. Frogs are ureotelic animals.

- Tadpoles are ammonotelic as they live in water and secrete ammonia as nitrogenous waste.

511. Structure present in man absent in frog

(a) salivary gland (b) pancreas
(c) adrenal gland (d) thyroid gland

AMU-2008

Ans. (a) : Frogs don't have salivary glands, inside their mouths, that drip saliva, instead the tongue itself secretes the saliva.

- In humans, salivary gland in the mouth secretes salivary enzymesm, which helps in the digestion of carbohydrate. This gland is absent in frogs.

512. Absence of thumb is characteristic of:

(a) Monkey (b) Man
(c) Rabbit (d) Frog

Haryana PMT-1999

@apna_pdf

Ans. (d) : There are 5-digits in hindlimb of frog which is longer in size, and 4 digits in fore limb which is shorter is size and thumb is not present in fore limb, the absence of thumb is a feature of the frog. The structure of the feet and legs varies depending on their habitat.

513. Endostyle is present in:
(a) ammocoetus larva (b) axolotl larva
(c) ascidian tadpole (d) frog′s tadpole

AP EAMCET-2001

Ans. (c) : Endostyle is present in ascidians tadpole, Ascidians are marine invertebrate chordates. Their tadpole larvae contain a dorsal tubular nervous system.

• Ascidians have a free-swimming, tadpole like larva, an adult saclike body with two siphons that allow water flux, and a large bronchial basket, provided with a ventral endostyle.

514. Acetabulum is the cavity of :
(a) pelvic girdle of frog
(b) sternum of frog
(c) pectoral girdle of frog
(d) all of the above

Manipal-2003

Ans. (a) : The perforate acetabulum is a cup shaped opening on each side of the pelvic girdle formed where the ischium, ileum and pubis all meet and into which the head of the femur end.

515. The function of iris in the eyes of frog is to
(a) alter the size of pupil
(b) move nictitating membrane
(c) refract light rays
(d) move the lens forward and backward

VMMC-2010

Ans. (a) : The muscles associated with the iris regulate the amount light entering the eyeball by adjusting the size of the pupil. Smooth muscle cells of a frog iris sphincter contain rhodopsin and contract in response to light. It is the coloured part of the eye, which regulates the size of the pupil controlling the entry of light into the eye.

516. In frog, according to modern theory of blood circulation, the trabeculae help in:
(a) separation of pure and impure blood
(b) to given mechanical strength to the ventricle
(c) increasing the inner surface area of ventricle
(d) to detect blood pressure

AP EAMCET-1997

Ans. (c) : In frog, according to modern theory of blood circulation, the trabeculae help in increasing the inner surface area of ventricle. In frogs the ventricle has thick, muscular and spongy wall. Its inner surface has irregular strands or ridges called trabeculae.

517. Structure of which remain unchanged during metamorphosis in frog's tadpole?
(a) Lungs (b) Brain
(c) Heart (d) intestine

CG PMT-2011

Ans. (b) : The nervous system undergoes least changes during metamorphosis of frog's tadpole frog's nervous system once differentiated remains as such throughout life. However, the brain acquires its normal shape and size. Metamorphosis in frog is a thyroxin mediated process during which changes occurs in the structure of lung, heart and intestine but there is no such a severe change in nervous system.

518. In frog, innominate vein is formed by the union of the veins:
(a) lingual and mandibular
(b) subscapular and internal jugular
(c) branchi and musculocutaneous
(d) external jugular and subclavian

AP EAMCET-2000, 1999

Ans. (b) : An internal jugular (bringing blood from the head) and a subscapular (from the back of shoulder) is the two union veins of innominate vein.

519. In Frog, Astragalus, is a part of:
(a) wrist (b) pectoral girdle
(c) ankle (d) pelvic girdle

AP EAMCET-2000, 1999

Ans. (c) : Astragalus calcaneum is a compound bone of ankle. It is made up of two tarsal bones the tibiole or astragalus and fibulare or caclcaneum. This bone helps in jumping and leaping.

520. In frog skull, the bone that connects sphenethmoid with maxilla:
(a) pterygoid (b) squamosal
(c) palatine (d) pre maxilla

AP EAMCET-1999

Ans. (c) : In frog skull, the bone that connects sphenethmoid with maxilla is palatine.

521. In frog, the nerve that innervates the retractor bulli muscles of the eye:
(a) optic nerves (b) oculomotor
(c) pathetic nerve (d) abducens nerve

AP EAMCET-1999

Ans. (d) : The abducans nerve also known as the 6th cranial nerve, cranial nerve 6th that controls the movement of the lateral rectus muscle.

522. In frog, stratum spongiosum is made up of:
(a) dense connective tissue
(b) loose fibrous connective tissue
(c) fasienti
(d) stratified epithelium

AP EAMCET-1999

@apna_pdf

Ans. (b) : The stratum spongiosum is the large middle layer. It contains the main portions of uterine glands and accompanying blood vessels, the stromal cells are more loosly arranged and larger than in the stratum campactum.

523. The blood supply to the eyes of frog is through:
(a) lingual artery
(b) internal carotid artery
(c) palatine
(d) occipito ventral artery

AP EAMCET-1999

Ans. (b) : Internal carotid artery is the larger outer branch of common carotid arch. This artery supplies the blood to the orbit and eyes of frog.

524. In frog, the hypoglossal nerves are:
(a) 1st pair of spinal nerves
(b) 12th pair of cranial nerves
(c) 9th pair of spinal nerves
(d) 7th pair of cranial nerves

AP EAMCET-1999

Ans. (a) : The hypoglossal nerve is mainly a somatic efferent (motor) nerve to innervate the tongue musculature. The nerve also contains some sympathetic postganglionic fibres from the cervical ganglia, which innervates tongue vessel and some small glands in the oral mucosa.

525. In frog coracoids fenestra is associated with:
(a) pelvic girdle (b) pectoral girdle
(c) skull (d) vertebral column

AP EAMCET-1999

Ans. (b) : Caracoid region is made up of 2 bones namely -
- Clavicle
- Caracoid
- The pectoral girdle is designed to absorb the shock when it lands on its forelimbs, an elastic muscular suspension connecting the pectoral girdle to the skull and vertebral column provides this ability.

526. Acoustic spots in frog are present in
(a) ossious labyrinth
(b) carotid
(c) membranous labyrinth
(d) all of the above

VMMC-2007

Ans. (c) : The membranous labyrinth is Lodged within the body cavities. It contains fluid, the endolymph, and on its walls, the ramification of the acoustic nerves are distributed.

527. Tadpole of frog is
(a) ammonotelic (b) ureotelic
(c) uricotelic (d) none of these

AMU-1996

Ans. (a) : Tadpoles are ammonotelic because they live in water so that ammonia is excreted through their body and frogs are ureotelic because they live on land and excrete urea.

528. Cloacal aperture of frog is used to pass out
(a) sperm (b) faeces
(c) urine (d) all of these

AFMC-2010

Ans. (d) : The ureters act as a urinogenital duct which opens into the cloaca. Cloacal aperture is the opening of the cloaca through this opening urine undigested food, eggs, and sperms are passed away, as it is a common passage. It is present in amphibians, birds, fishes and monotremes.

529. The fourth cleavage plane during development of frog's egg is
(a) Double meridional (b) Single meridional
(c) Single latitudinal (d) Double latitudinal

Karnataka CET-2012

Ans. (a) : The first cleavage in a frog's egg is meridional i.e. from animal to vegetal pole resulting in a two celled stage. These cells are also called as blastomeres. The second cleavage is also meridional and results in four blastomeres. The third cleavage is latitudinal, i.e. in the equatorial direction. Out of the eight blastomeres formed, four are large in size and remain near the vegetal pole. These are called macromeres. The fourth cleavage is meridional and unequal holoblastic. They are unequal and divide the micromeres more rapidly than macromeres.

530. A gradual decrease in the size of the tail during metamorphosis in the life cycle of frog is a good example for
(a) cell senescence
(b) pinocytic activity
(c) programmed cell death
(d) cell necrosis

Karnataka CET-2008

Ans. (c) : A gradual decrease in the size of the toil during metamorphosis in the life cycle of frog is a example of programmed cell death. Apoptosis is the process of programmed cell death. It is used during early development to eliminate unwanted cells. Apoptosis also plays a role in preventing cancers.

531. Cleavage in frog's zygote is
(a) diploblastic (b) heteroblastic
(c) holoblastic (d) meroblastic

UP CPMT-2005

Ans. (c): Cleavage in frogs embryo is **holoblastic unequal and bilateral**. This type of cleavage occur in mesolecithal egg in which the zygote divides completely to form small sized cells towards the animal pole which has almost no yolk and into larger yolky cells towards the vegetal pole.

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532. Number of cranial nerves in frog

(a) 10 pairs (b) 9 pairs
(c) 12 pairs (d) None of these

UP CPMT-2005

JIPMER -2006

Ans. (a): Number of cranial nerve in amphibian is 10 pairs.

- A frog has 10 pairs of cranial nerves. They are- (i) Olfactory (ii) Optic (iii) Oculomotor (iv) Trochlear (v) Trigeminal (vi) Abducens (vii) Facial (viii) Auditory (ix) Glossopharyngeal (x) Vagus.

533. Bidder's canal is found in

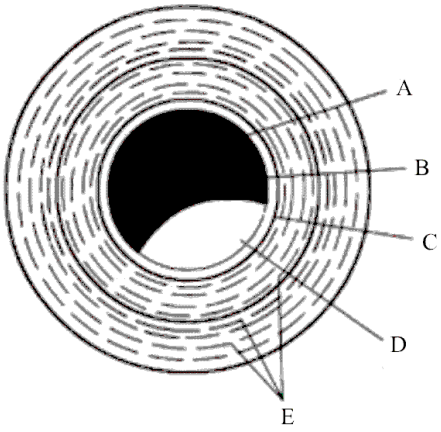
(a) testes of frog (b) kidney of frog
(c) kidney of mammals (d) ovary of mammals

UP CPMT-2011

Ans. (b): Bidder's canal is found in the kidney of male frog and it help in transfer of sperm via the vasa efferentia. Vasa efferentia open into the Bidder's canal.

- The Bidder canal is connected to the longitudinal collecting tubules open into the ureter.

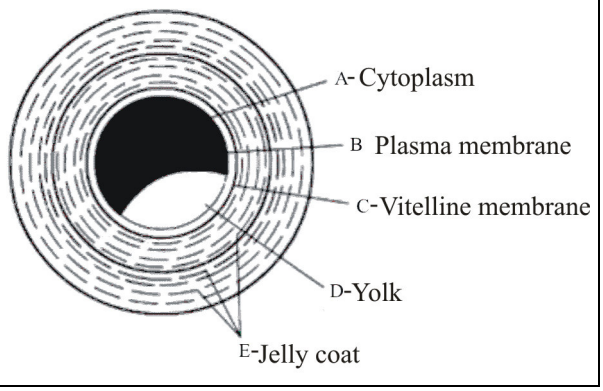
534. The following is a diagram of the just spawned frog's egg, with the parts labelled from A to E Identify the parts and choose the correct option from those given below.



(a) A = Cytoplasm, B = Plasma membrane, C = Vitelline membrane, D = Yolk, E = Jelly Coat
(b) A = Cytoplasm, B = Vitelline membrane, C = Plasma membrane, D = Yolk, E = Jelly Coat
(c) A = Yolk, B = Plasma membrane, C = Vitelline membrane, D = Cytoplasm, E = Jelly Coat
(d) A = Yolk, B = Jelly Coat, C = Vitelline membrane, D = Cytoplasm, E = Plasma membrane

Karnataka CET-2006

Ans. (a) :



535. In frog, the vertebra with an anterior convex surface (i.e. double convexties) is

(a) atlas (b) urostyle
(c) 8th vertebra (d) 9th vertebra

JIPMER-2004

Ans. (d) : The ninth vertebra is also known as sacral vertebra. Both the sides (bearing one convexity anteriorly and two convexities posteriorly). The anterior convexity fits into the posterior concavity of eighth vertebra.The ileum of the pelvic girdle articulates with the transverse process of 9th vertibrae.

536. The epithelial lining in the alveoli of the frogs facing lung cavity is

(a) squamous ciliated
(b) columnar ciliated
(c) columnar nonciliated
(d) squamous nonciliated

JIPMER-2004

Ans. (b) : The epithelial lining in the alveoli of the frogs facing lung cavity is columnar ciliated. Columnar ciliated epithelium is mainly present in inner surface of hollow organs.

537. Carotid labyrinth contains:

(a) olfactory receptors (b) baroreceptors
(c) chemoreceptors (d) phonoreceptors

JIPMER-2015

Ans. (b) : The carotid labyrinth is a gland found at the base of the internal carotid. It is probably a sensory organ. It has baroreceptors which function to control the blood pressure.

538. Acoustic spots in frog are present in

(a) ossius labyrinth
(b) carotid
(c) membranous labyrinth
(d) All of the above

UP CPMT-2002

Ans. (c) : The membranous labyrinth is a group of ducts and chambers filled with endolymphatic fluid. It is located within the bony labyrinth and can be sub-divided into the vestibular labyrinth and cochlear labyrinth.

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08 CELL : STRUCTURE AND FUNCTIONS

A. Cell : The Unit of Life

1. Wich of the following technique, other than microscopy is used for study of cell?

(a) Maceration (b) Plasmolysis
(c) Chroma tography (d) Autoradiography

BHU-PMT (Screening)-2008
Manipal-2008 / BVP-2008
Uttarakhand PMT-2007
BHU PMT-2004

Ans. (d) : An important method for examining chemical production and tracing the event or metabolic pathways in cells is autoradiography.

2. The term protoplasm for the cell contents was coined by

(a) Von Mohl
(b) J.E. Purkinje
(c) J.S. Huxley and Hertwig
(d) M. Schultz

J&K CET-2005 / JCECE-2005
Punjab MET-2004
CG PMT-2005, 2004

Ans. (b) : J.E Purkinje used term protoplasm in plant cells.

- M.Schultze proposed protoplasmic theory.
- Von Mohl given the importance of the protoplasm in plant cell.
- Huxley explained protoplasm is the physical basis of life in energy generated of the protoplasm.

3. Programmed cell death is scientifically termed as

(a) autotomy (b) cell lysis
(c) apoptosis (d) None of these

BCECE-2014, 2011
VMMC-2012
UP CPMT-2008
Rajasthan PMT-2008
BHU PMT (Screening)-2006

Ans. (c) : Programmed cell death is known as apoptosis, commonly referred to as "cell suicide" or cellular suicide. It is a tightly regulated and controlled process that occurs in multicellular organisms to eliminate unwanted, damaged , infected or potentially harmful cells without causing inflammation or damage to surrounding tissues.

4. Choose the correct statement

A. Porins allow the entry of small proteins present in the membrane of mitochondria, chloroplast and bacteria

B. When a living cell is kept in hypertonic solution, water potential is equal to solute potential.

C. Carrier proteins will allow entry of all substances across the membrane, whereas pumps transport large molecuoles in a passive method

D. Bulk flow occurs by diffusion

(a) A, B (b) C, D
(c) A, D (d) B, C

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : • Porins allow the entry of small proteins present in the membrane of mitochondria, chloroplast and bacteria.
• A living cell is kept in hypertonic solution, water potential is equal to solute potential.
The porins are protein from transporting solutes and metabolites across the outer mitochondrial membrane, chloroplast and bacteria.

5. Assertion (A) : Ions and organic material concentration is higher in cytoplasm than vacuole

Reason (R) : Tonoplast facilitates the transport of ions and other materials against concentration gradient into vacuole

The correct option among the following is

(a) (A) and (R) are true. (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : The vacuole is an organelle in plant cells that stores various ions, nutrients, and waste products. It helps maintain the cells osmotic balance and pH, and some ions are indeed present at higher concentrations in the vacoule compared to the cytoplasm.

6. Match the column I with Column II.

Column-I		Column-II	
A.	Coronary artery disease	i.	The blood pressure above 140/90.
B.	Hypertension	ii.	Accumulation of calcium, fat cholesterol in coronary arteries
C.	Angina pectoris	iii.	Heart unable to pump sufficient blood
D.	Heart failure	iv.	Chest pain caused by Ischemia

(a) A – i, B – iii, C – ii, D – iv
(b) A – ii, B – i, C – iv, D – iii
(c) A – ii, B – i, C – iii, D – iv
(d) A – iv, B – ii, C – i, D – iii

AP EAPCET-22.05.2023, Shift-II

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Ans. (b) :

A.	Coronary artery disease	ii.	Accumulation of calcium, fat cholesterol in coronary arteries
B.	Hypertension	i.	The blood pressure above 140/90.
C.	Angina pectoris	iv.	Chest pain caused by Ischemia
D.	Heart failure	iii.	Heart unable to pump sufficient blood

7. Following is not a part of symplastic system

(a) Plasmodesmata (b) Cell membrane
(c) Cell wall (d) Cytoplasm

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Symplast does not involve intercellular space and cell wall. In this, water moves from epidermis to the xylem passing through cortex, endodermis and pericycle.

8. Structural elements of cells

(a) Nitrogen, Phosphorus, Potassium and Oxygen
(b) Nitrogen, Hydrogen, Oxygen and Carbon
(c) Magnesium, Potassium, Carbon and Chlorine
(d) Oxygen, Nitrogen, Sulphur and Potassium

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : The structural elements of cells Nitrogen, hydrogen, oxygen and carbon. Most biological molecules, such as proteins, carbohydrates, lipids and nucleic acid are exclusively composed of these element.

9. The following cell organelles are considered as endomembrane system

(a) Mitochondria–Lysosome–Endoplasmic reticulum
(b) Endoplamic reticulum–Golgi complex–chloroplast
(c) Endoplasmic reticulum–Lysosomes–Peroxisomes
(d) Endoplasmic reticulum–Golgi complex–Lysosomes

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : The endomembrane system include ER, golgi complex, lysosomes and vacuoles. Since the function of the mitochondria, chloroplast and peroxisomes are not coordinated with the above components, these are not considered as part of the endomembrane system.

10. Choose the correct one

A	B	C
I. Golgi bodies	**Single membrane**	**Protein synthesis**
II. Mitochondrion	**Power house of the cell**	**DNA Replication**
III. Chloroplast	**Carbohydrate synthesis**	**Protein synthesis**
IV. Nucleolus	**Ribosomal factory**	**80s and 70s ribosomes synthesis**

(a) I,II,III,IV (b) II,III
(c) II,III,IV (d) II only

AP EAPCET-11.07.2022 Shift-I

Ans. (b) : Aerobic respiration occurs in the mitochondria and productin of ATP therefore mitochondria is called power house of cell. Mitochondrial DNA replication is initiated at (OH) strand and proceeds. Unidirectionally to produce the full length nascent it strand. Carbohydrates assimilate in chloroplast during the day with some stored as starch or degraded to supply sugars for growth at night.
Most chloroplast proteins are synthesized in the cytoplasm imported and then targeted to a specific chloroplast compartment.
Chloroplasts are specialized to perform photosynthesis.

11. Statement A : Shape of the cell is variable with the function they perform.
Statement B: Neuron cell is longest and branched animal cell that sends and receives signal from brain.

(a) A is false, B is true
(b) Both A and B are false
(c) A is true, B is false
(d) Both A and B are true

AP EAPCET-11.07.2022 Shift-I

Ans. (d) : There is great variability in cell shape ie, spherical, polygonal, disc-like cuboidal, columnar, spindle-like, etc. The shape of the cell may vary with the function they perform e.g. Xylem vessels are long as they have to form long water conducting channels.
Nerve cells are long and branched.

12. Which of the following is the first cell of human life ?

(a) Oosphere (b) 1st polar body
(c) Oospore (d) Synkaryon

MHT CET-07.10.2020 Shift-I

Ans. (d) : Synkaryon refers to a cell that contains two distinct sets of chromosome from two different parent cell within a single nucleus. This occurs in somatic hybridization.

13. The nuclear pores are the passages for which of the following?

(a) RNA and proteins
(b) Chromosomes
(c) Ribosomes and Proteins
(d) Histone proteins

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : RNA and protein molecule travel between the nucleus and cytoplasm through nuclear pores when the RNA produced by nucleus.

14. Choose the correct statements

(i) Ribosomes are found in Cytoplasm, Chloroplasts, Mitochondria and on rough ER
(ii) Mesosomes in bacteria are not the sites of DNA replication
(iii) Algae cell wall made of cellulose, galactans, mannan and calcium carbonate
(iv) Mitochondria, chloroplast and peroxisomes are the part of Endomembrane system

(a) i, iv (b) i, ii
(c) i, iii (d) ii, iii

AP EAMCET-25.04.2018 Shift-I

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Ans. (c) : Ribosomes are found in both prokaryotic and Eukaryotic cells. The number ranges upto 5,00,000 per cell. In prokaryotic cells the ribosome's are found in free state while in eukaryotic cells they may be free or found associated with ER by their larger subunits. Ribosomes are also found in mitochondria and plastids. The cell wall in algae are made up of mainly two components.
(a) The fribrillar component : cellulose mannans, xylans.
(b) The amorphous component : galactans such as agar and carrageenin.

15. Study the following lists

List -I		List-II	
(A)	**Mesophyll cells**	**(I)**	**Branched and long**
(B)	**Tracheid cells**	**(II)**	**Amoeboid shaped**
(C)	**Nerve cells**	**(III)**	**Round and oval**
(D)	**White blood cells**	**(IV)**	**Elongated**
		(V)	**Long and narrow**

The correct answer is

	(A)	(B)	(C)	(D)
(a)	(i)	(ii)	(v)	(iv)
(b)	(ii)	(iii)	(iv)	(i)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(v)	(iv)	(i)	(iii)

TS EAMCET-03.05.2018 Shift-I

Ans. (c) : (A) Mesophylls cells – Round and oval
(B) Tracheid cells – Elongated
(C) Nerve cells – Branched and long
(D) White blood cell – Amoeboid shaped.

16. Choose wrong pair from the following

(A)	**Theodore Schwann**	**Animal cell**	**Plasma membrane**
(B)	**Vesicles, lamellae, tubules**	**prokaryote**	**contain pigments**
(C)	**Phosphate granule**	**Eukaryote**	**Lysosomes**
(D)	**Nucleosome**	**Eukaryote**	**DNA packaging in nucleus**

Options:
(a) A, B (b) B, C
(c) A, C (d) A, D

AP EAMCET-28.04.2017 Shift-I

Ans. (b) : Vesicles lamellae tubules are present in only prokaryotic cells. They are in folding of plasma membrane. Phosphate granules are inclusions bodies that lie free in the cytoplasm of prokaryotic cell.

17. Study the following table

(A) Peroxysomes	**Glyoxysomes**	**Microbodies**
(B) Flagella	**Peripheral Microtubules**	**9 pairs**
(C) Cytoskeleton	**Eukaryotic cell**	**Cell motility**
(D) Chromoplastids	**Carotenoid pigments**	**Water soluble**

The correct combination are
Options :
(a) A, B, D
(b) A, B, C
(c) B, C, D
(d) A, C, D

AP EAMCET-28.04.2017 Shift-I

Ans. (b) : A, B, C is right and chromoplastids is coloured plastid other then green may be orange, red blue, yellow.
These are found in the ripening pericarp of the fruits.

18. Generally the smaller the cell
(a) the larger the nuclei
(b) the smaller the nuclei
(c) it will be more metabolically active
(d) it will be less metabolically active

Tripura JEE-2017
CMC Ludhiana-2011

Ans. (c) : The surface area of cells determines the exchange of materials. The increase in the volume of cell increase its metabolic activity. A smaller cell is more effective and transporting materials in leveling waste products then a larger cell.

19. 80% of the cell has :
(a) minerals (b) water
(c) protein (d) carbohydrates

AFMC-2000

Ans. (b) : Water is the most abundant molecule in the cells because it accounts for nearly 70-90 percent of its total mass. Water regulates body temperature provides moisture, protects the body organs.

20. Which of the following cells is phagocytic in nature?
(a) Mast cell (b) Podocytes
(c) Macrophages (d) Fibroblast cells

AFMC-2000

Ans. (c) : Neutrophils, Monocyte and Macrophages are types of white blood cells. The granular white blood cells. Neutrophils eosinophils and a granular leucocyte including monocyte and tissue macrophages are phagocytic in nature.

21. Which of the following sets of cell organelles contain DNA?
(a) Nucleus, chloroplast, mitochondria
(b) Nucleus, ribosome, lysosome
(c) Chloroplast, mitochondria, ribosome
(d) Nucleus, nucleolus, ribosomes

BHU PMT-2002

@apna_pdf

Ans. (a) : The nucleus contains the cellular DNA which is used as the primary regulating DNA. Most cellular process are regulated and controlled by the DNA in the nucleus expect the nucleus mitochondria and chloroplast have their own DNA in a circular form as the prokaryotic cells.

22. Those cells lipid is actively synthesized contains more:

(a) Nucleus (b) R.E.R.
(c) S.E.R (d) Golgi body

Rajasthan PMT-1996

Ans. (c) : The smooth endoplasmic reticulum is the major site for synthesis of lipid. In animal cells lipid like steroidal hormones are synthesized in SER.

23. In synapsis two homologous chromosomes are connected at

(a) centromeres (b) chromomeres
(c) telomeres (d) none of these

MGIMS Wardha-2007

Ans. (a) : Chromosomes that are identical to each other are chromosomes that have their chromosomal arms and the same genes arranged in the same order. They are joined to the centromere.

24. The unit used for the measurement of size of cell is

(a) nm (b) mm
(c) Å (d) μm

Manipal-2011

Ans. (d) : Measuring unit of size of the cells is micrometer.

25. Match the Column I with that of Column II and chose the correct combination from the options given,

Column I - Organelle		Column II – Site for	
p.	Rough ER	1.	Synthesis of glycoproteins
q.	Smooth ER	2.	Aerobic respiration
r.	Mitochondria	3.	Synthesis of lipid
s.	Golgi apparatus	4.	Protein synthesis

(a) (p) - (1), (q) - (2), (r) - (3), (s) - (4)
(b) (p) - (2), (q) - (3), (r) - (4), (s) - (1)
(c) (p) - (3), (q) - (4), (r) - (2), (s) - (1)
(d) (p) - (4), (q) - (3), (r) - (2), (s) - (1)
(e) (p) - (4), (q) - (3), (r) - (1), (s) - (2)

Kerala PMT-2015

Ans. (d) :

Rough E R	Protein synthesis
Smooth E.R	Synthesis of lipid.
Mitochondria	Aerobic respiration
Golgi apparatus	Synthesis of glycoproteins.

26. The collection of various types of molecules in a cells is called

(a) Primordial soup (b) Cellular broth
(c) Cellular pool (d) Molecular broth

Ans. (c) : The term cellular pool refers to the collection of different kinds of molecules that compose the cell. It refers to all the various molecules that compose a cell including proteins, lipid, nucleic acid, sugar and organic and inorganic components required for the survival and operation of the cell.

27. Inside a cell, the respiratory enzyme are contained in

(a) Lysosomes (b) Ribosomes
(c) Acrosomes (d) None of these.

AMU-1998

Ans. (d) : The respiratory enzymes are present in the inner membrane of mitochondria. The enzymes for the citric acid cycle (krebs cycle) are located in the matrix.

28. Chemical composition of protoplasm contains :

(a) O, C, H and N
(b) O, N and Fe
(c) O, protein and minerals
(d) H, C and Fe

BVP - 2008
Rajasthan PMT-1998

Ans. (a) : Chemical composition of protoplasm

(i) Water- 80-90%

(ii) Organic matter → Protein (largest), fat, carbohydrate, enzymes, Hormones, Vitamin

Macro elements ranges in large quantity.

Oxygen	-	62%
Carbon	-	20%
Hydrogen	-	10%
Nitrogen	-	3%
Phosphorous	-	1.14%

29. Pure fractions of cellular component can be isolated by

(a) chromatography
(b) scanning electron microscopy
(c) X-ray
(d) differential centrifugation

Kerala CET-2005
Manipal-2013

Ans. (d) : This method involves a series of centrifugation steps at different speed to sequentially isolate different cellular components based on their sedimentation rate.

30. Dutrochet has given the concept about cell in

(a) 1834 (b) 1814
(c) 1822 (d) 1824

JIPMER-2013

Ans. (d) : French scientists Dutrochet is credit with the cell theory. He discovered the connection between the plant cell and animal cell in his theory. He said that cell is a structural unit as well as physiological unit.

31. The theory that all the cells arise from pre-existing cells (Omnis cellula e cellula) was proposed by

(a) Schwann (1839) (b) Brown (1831)
(c) Virchow (1855) (d) Schleiden (1938)

CG PMT-2010
AMU-2015

Ans. (c) : Rudolf Virchow (1855) first explained that cells divided and new cells are formed from pre-existing cells (Omnis cellula-e-cellula).

@apna_pdf

32. The main arena of various types of activities of a cell is –

(a) Plasma membrane (b) Mitochondrian
(c) Cytoplasm (d) Nucleus

AIPMT (Screening)-2010

Ans. (c) : The cytoplasm is the main arena of cellular activities in both the plant and animal cells. various chemical reactions occur in it to keep the cell in the 'living state'

- Plasma membrane separates the intracellular and extracellular compartments of the cell.
- Mitochondria is involved in the production of ATP.
- Nucleus is the central processing unit of the cells, controlling the metabolic activities occurring in the cell.

33. Silk is obtained from:

(a) Bombyx mori (b) Laccifer lacca
(c) Apis mellifera (d) None of these

J&K CET-2004

Ans. (a) : The domestic silk moth, *Bomboxy mori* is a member of the Bombycidae family of moths. Its nearest cousin is the *Bomboxy mondarina* wild silk moth. The caterpillar or larva of a silk moth is called as silkworm. It is significant insect economically and the main source of silk.

34. The type of cell junction which facilitates cell to cell communication is

(a) tight junction (b) adhering junction
(c) gap junction (d) desmosomes
(e) brush borders

Kerala PMT-2008

Ans. (c) : Gap junctions connecting the cytoplasm of adjacent cells to make it easier for cells to interact with out another and allow for the quick movement of ions, small molecules and occasionally larger molecules.

35. The cytoplasm of neighbouring cells is connected with the help of

(a) Middle lamella
(b) Primary wall
(c) Mitochondria
(d) Endomembrane system
(e) Plasmodesmata

Kerala PMT-2012
Punjab MET-2006

Ans. (e). Plasmodesmata are cytoplasm threads or cytoplasmic bridge between two adjacent cells occurs in the plant cell exchange of material or communication between adjacent cell occurs through the plasmodesmata. It was first observed and named plasmodesmata is the by Star burger (1901).

36. By weight the most abundant element in a cell is

(a) carbon (b) hydrogen
(c) oxygen (d) sodium.

AMU-1995

Ans. (c) : Oxygen is the most abundant element found in the human body and it consists of 65% of the total weight. Carbon is the second most abundant element found in the human body and consist of 18.5% of the total weight. Hydrogen consists of 9.5% of the total weight of the human body. Sodium is an alkali metal.

37. A major breakthrough in the studies of cells came with the development of electron microscope. This is because

(a) The resolution power of the electron microscope is much higher than that of the light microscope.
(b) The resolving power of the electron microscope is 200-350 nm as compared to 0.1-0.2 nm for the light microscope.
(c) Electron beam can pass through thick materials, whereas light microscope requires thin sections.
(d) The electron microscope is more powerful than the light microscope as it uses a beam of electrons which has wavelength much longer than that of photons.

AIPMT-2006

Ans. (a) : An electron microscope is a microscope that use a beam of electrons as a source of illumination. The resolution power of the electron microscope is much higher than that of the light microscope.
The increased resolution results from the shorter wavelength of the electron beam, by exocytosis at the plasma membrane.

38. Living cell contains 60 - 75% water. Water present in human body is

(a) 60 - 65% (b) 50 - 55%
(c) 75 - 80% (d) 65 - 70%

AIPMT-1992

Ans. (d) : Water is most abundant substance in living beings. The water content of actively living cells varies between 60-75% .Brain contains 80 – 82% of water in whole human body. The amount of water in the body of human beings changes as per sex, age and also hydration levels.

39. Acetabularia used in Hammerling's nucleocytoplasmic experiments is:

(a) Unicellular fungus
(b) Multicellular fungus
(c) Unicellular uninucleate green algae
(d) Unicellular multinucleate green algae

AIPMT-1989

Ans. (c) : Unicellular uninucleate green algae called *Acetabularia* was used in Hammerlings nucleocytoplasmic experiments. Exchanging rhizoid and stalk was part of Hammerlings work with *Acetabularia*.

40. Nucleoproteins are synthesized in:

(a) Nucleoplasm (b) Nuclear envelope
(c) Nucleolus (d) Cytoplasm

AIPMT-1989

Ans. (d) : Nucleoproteins are conjugated proteins present in cells of living organisms that consist or nucleic acid with protein. Nucleoproteins are synthesized in cytoplasm of the cell.

41. Hammerling's experiments on Acetabularia involved exchanging:

(a) Cytoplasm (b) Nucleus
(c) Rhizoid and stalk (d) Gametes

AIPMT-1990

@apna_pdf

Ans. (c) : Acetabularia cell is made up of three segments rhizoid or base, stalk and cap. rhizoid are contains the mucleus. Hammerling's experiments on Acetabularia involved exchange of rhizoid and stalk.

42. According to modern colloidal theory, the protoplasm is a polyphasic colloidal system. This was first suggested by:

(a) Purkinje (b) Max Schultze
(c) R.A. Fisher (d) E. Strasburger

JCECE-2002

Ans. (c) : Modern colloidal theory was proposed by 'R.A Fisher'. According to this theory protoplasm is the polyphonic colloidal system. Protoplasm is a fluid substance which consists solid and semi-solid particles.

43. Solution of polyethylene glycol (PEG) or a very brief high voltage electric current is used in fusion of

(a) protoplasms (b) protoplasts
(c) somatic cells (d) germinal cells

Punjab MET-2007

Ans. (b) : Polyethylene glycols (PEGs) are products of condensed ethylene oxide and water that can have various derivatives and functions.
Protoplast are naked cells from which cell wall has been removed. Fusions of protoplast is done with solution of PEG or a very brief high voltage current.

44. Which of the following cells are round and biconcave in shape ?

(a) White blood cells
(b) Red blood cells
(c) Columnar epithelial cells
(d) Nerve cells
(e) Mesophyll cells

Kerala PMT-2011

Ans. (b) : The basic feature of human RBCs are circular (round) biconcave and non-nucleated with a diameter of about 7 μm or 10^{-6} meter. WBCs shape is irregular. Columnar epithelium consists of elongated or column like cells. Nerve cells are also called neurons mesophylls are the internal ground tissue present in leaves.

45. The branch of Biology dealing with structure, function and reproduction of cell is:

(a) Cytology (b) Anatomy
(c) Histology (d) Cell biology

J&K CET-2005

Ans. (d) : The study of structure and function of the cell called cell biology including. Physiology, biochemistry and genetics. Cytology is the study of structure of cell where as histology is the study of tissue and cells.

46. Comparing small and large cells, which statement is correct?

(a) Small cells have a small surface area per volume ratio
(b) Exchange rate of nutrients is fast with large cells
(c) Small cells have a large surface area per volume ratio
(d) Exchange rate of nutrients is slow with small cells

DUMET-2011

Ans. (c) : To maintain surface area - to - volume ratio in a balanced state, some cells are provided with microvilli, which increases the absorptive area. In small cells the random, tiny motions of molecules can easily distribute material. Small cell have a large surface area per volume ratio.

47. Which of the following is not a function of water in cell?

(a) It provides energy for chemical reaction
(b) It act as a solvent
(c) It provides a medium for chemical reaction
(d) It release hydrogen ions on ionization

Rajasthan PMT-2002

Ans. (a) : Providing energy for chemical reaction is not a function of water in cell. Water use as universal solvent and act as a maintain a cell inside.

48. A cell is kept in a solution for sometimes, when it bursts. The solution should be :

(a) isotonic (b) hypertonic
(c) hypotonic (d) monotonic

Manipal-2001

Ans. (c) : A cell kept in a certain solution bursts after sometime. Due to the inward movement of water, that is called endosmosis and the type of solution in which endosmosis takes place is known as a hypotonic solution. In a hypotonic solution solute concentration is lower than that of the solute concentration inside the cell, thus facilitating endosmosis leading to the bursting of cell.
Solution that contain the same concentration of water and solutes as the cell cytoplasm are called is isotonic solution. Solution that has a higher concentration of solutes on the outside of a cell is hypertonic solution.

49. Auxetic growth is increase in

(a) cell volume only
(b) cell number only
(c) fatty tissue
(d) intercellular material

BVP-2014

Ans. (a) : Auxetic growth:- growth in certain organism happens as a result of an increase in cell size. There are exactly the same amount of cells. Cell growth result in an increase in body size. For example- Nematodes, rotifers and tunicates.

50. When a cell of diameter 2 μm grows to double its diameter, what will happen to its surface area volume relationship ?

(a) It will remain the same
(b) It will reduce to half
(c) It will double
(d) It can not be determined

Karnataka CET-2005

Ans. (b) :

Initial	Final
◯	◯
$d = 2\mu m$	$d = 4\ \mu m$
so $r = 1\mu m$	$r = 2\mu m$
Surface area $= 4\pi (1)^2$	$SA = 4\pi (2)^2$

@apna_pdf

Volume $= \frac{4}{3}\pi(1)^3$ Volume $= \frac{4}{3}\pi(2)^3$

$\frac{SA}{V} = \frac{4\pi\times1}{\frac{4}{3}\pi\times1} = 3:1$ $\therefore \frac{SA}{V} = \frac{4\pi\times4}{\frac{4}{3}\pi\times8} = 3:2$

Hence, the surface area volume relationship will reduce half.

51. Which of the following sentences is correct?

(a) Cells of all living organisms have a nucleus.
(b) Both animal and plant cells have a well defined cell wall.
(c) In prokaryotes there are no membrane bound cell organelles.
(d) Cells are formed de novo from abiotic materials.

Karnataka CET-2015

Ans. (c) : Prokaryotic cells are simple cells that don't have a nucleus or membrane - bound organelles. They do have DNA and Ribosome. The absence of intracellular compartmentalization indicates the primitive nature of prokaryotic cells. Eg. Bacteria blue green algae, archaea, mycoplasma etc.

52. Cell eating is called:

(a) osmosis (b) diffusion
(c) pinocytosis (d) phagocytosis

Karnataka CET-2000

Ans. (d) : The process which a cell consumes or engulfs a big particle is known as phagocytosis. As a result the phagocytic cell develops many compartments known as phagosomes. This is an additional endocytosis process.

53. The protoplasm is

(a) emulsion (b) colloidal
(c) suspension (d) None of these

JCECE-2014
CG PMT-2004

Ans. (b) : Protoplasm is clear translucent odorless colour less crystallo - colloid type of solution. (eg - sugar, salt acid crystal). Protoplasm is the mixture of the chemicals found in crystal formed. Eg - sugar, salt acid and bases.
On the other hand chemicals of colloidal nature. Eg - Protein, lipids and polysaccharids. An emulsion is a solution of two or more immiscible liquids where one liquid contains a dispersion of the other liquids. A suspension is a heterogeneous mixture.

54. The physical basis of life is

(a) nucleus (b) sex chromosomes
(c) protoplasm (d) DNA

CG PMT-2004

Ans. (c) : Huxley referred to protoplasm as ' Physical basis of life as all the properties of life reside in the protoplasm and also energy is generated in the protoplasm. The nucleus is called the director of the cell as it controls and conducts all activities of a cell. Sex chromosomes are the chromosomes that are responsible for sex determination.

55. Cork cells are dead because they do not possess

(a) Cellulosic cell wall
(b) Permeable cell wall
(c) Protoplast
(d) Meristematic activities

CMC Vellore-2011

Ans. (c) : Cork cells are indeed dead at maturity because they lack several cellular components that are typically found in living cells. During the suberization the protoplast which includes the cells cytoplasm and nucleus, disintegrates and is lost. This means that cork cells no longer have the essential living components required for cellular metabolism.

B. Cell Theory

56. Cell theory was formulated by

(a) Schleiden and Robert Brown
(b) Schleiden and Schwann
(c) Schwann and Robert Brown
(d) Robert Hook and Robert Brown

Karnataka CET-2022
JIPMER-2008,2006
CGPMT-2006,2005
BVP-2002
AMU-2001
Rajasthan PMT-2000
Haryana PMT-1999

Ans. (b) : Cell theory was formulated by Mathias Schleiden and Theodor Schwann in the mid 19th century. They both made significant contributions to the development of cell theory, which states that all living things are composed of one or more cells, the cell is the basic unit of life, and new cells arises from pre- existing cells.

57. The statement omnis cellula e cellula of Rudolf Virchow has been taken from his book:

(a) Cellular pathology (b) Cellular potency
(c) Micrographia (d) Scala naturae

NEET-2019
Manipal-2006, 2014
JIPMER-2011
Rajasthan PMT - 2011
AMU – 2015 / AIIMS-2007

Ans. (a) : The statement Omnis cellula e cellula of Rudolf Virchow has been taken from his book cellular pathology.

58. Robert Hooke used the term cell in the year

(a) 1650 (b) 1665
(c) 1865 (d) 1960

MANIPAL-2008
Uttarakhand PMT-2008
BHU-PMT (Screening)-2008
BVP-2007 / BHU PMT-2004

Ans. (b) : Robert Hook- English botanist (1665)
(i) Coined the term cell
(ii) Discovered cell wall in cork cell.
(iii) Wrote a book Micrographia

59. The cell as a basic unit of structure of living things was discovered by :

(a) Aristotle
(b) Robert Hooke

@apna_pdf

(c) Schleiden and Schwann
(d) Gregor Mendel

J&K CET-2005, 2001
DUMET-2005
UP CPMT-2003

Ans. (b) : Robert Hooke was the first who discovered the cell. He observed honey comb like pattern in thin slice of the cork inclosed by thick cell wall and called it cell and published his work in his book 'Micrographia' which was published in 1665. Actually Robert Hooke discovered dead cell.

60. Identify the correct matches

	Column -I		column -II
A.	Tetany	i.	Autoimmune disorder
B.	Myasthenia gravis	ii.	Decreased bone mass
C.	Gout	iii.	Rapid muscle spasms
D.	Osteoporosis	iv	Accumulation of uric acid in joints

(a) A – iv, B – iii, C – ii, D – i
(b) A – i, B – iii, C – ii, D – iv
(c) A – iii, B – i, C – ii, D – iv
(d) A – iii, B – i, C – iv, D – ii

Ans. (d) :

A.	Tetany	iii.	Rapid muscle spasms
B.	Myasthenia gravis	i.	Autoimmune disorder
C.	Gout	iv.	Accumulation of uric acid in joints
D.	Osteoporosis	ii.	Decreased bone mass

61. Hypertrophy of RBC and spleenomegaly are the symptoms of

(a) Malaria (b) Amoebiasis
(c) Filariasis (d) Typhoid

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : The hypertrophy of RBC and spleenomegaly are the symptoms of malaria.
Typhoid– Typhoid fever is a potentially fetal infection caused by the Salmonella typhi bacteria.
Filariasis is caused by Wuchereria bancrofti.
Amoebiasis is caused by Entamoeba histolytica.

62. In human beings Lymphadentis is caused due to infection of

(a) common round worm
(b) Hooke worm
(c) Filarial worm
(d) Tape worm

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : In human beings Lymphadentis is caused due to infection of filarial worm (e.g.- Wuchereria bancrofti), filarial worm also called as-roundworm (Nematodes). Lymphadentilis is an infection of lymph nodes (also called nymph gland). It is a complication of certain bacterial infections.

63. Match the following lists:

	List I		List II
A	Leeuwenhoek	I)	Observed different kinds of cells forming the tissues in plants
B	Robert Brown	II)	Cell wall is the unique character of the plant cell
C	T. Schwann	III)	New cells are formed from- pre-existing cells
D	M. Schleiden	IV)	First to observe a living cell
E	Rudolf Virchow	V)	Observed nucleus in a cell

The correct match is:

	A	B	C	D	E
(a)	IV	III	V	I	II
(b)	IV	II	V	I	III
(c)	IV	V	II	I	III
(d)	IV	V	I	II	III

TS EAMCET-31.07.2022 Shift-I

Ans. (c) : Leeuwenhoek - First to observe a living cell
Robert Brown - Observed nucleus
T. Schwann - Cell wall is the unique character of the plant cell
M. Schleiden - Observed different kinds of cell forming the tissue in plant
Rudolf Virchow - New cells are formed from pre-existing cells.

64. Fill up the blanks with suitable words.
Schleiden __i__ observed that all plants are composed of different kind of cells.
Schwann __ii__ studied animal cells and reported that plants have __iii__ and all cells have __iv__, and Virchow explained that cells divide and form new cells from __v__. This constitute __vi__.

(A) Cell theory
(B) Zoologist
(C) Existing cells
(D) Cell wall
(E) Plasma membranes
(F) Botanist

Options:

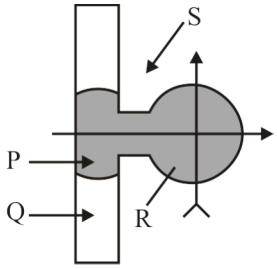
	i	ii	iii	iv	v	vi
(a)	B,	F,	E,	D,	C,	A
(b)	F,	B,	E,	D,	A,	C
(c)	A,	B,	C,	D,	E,	F
(d)	F,	B,	D,	E,	C,	A

TS EAMCET-28.09.2020 Shift-I

Ans. (d) : Schleiden was a Botanist observed that all plant are composed of different kind of cells. Schwann was a Zoologist studied animal cells have plasma membrane and Virchow explained that cells divide and form new cells from existing cells. This constitute cell theory.

@apna_pdf

65. Identify the part which is made up of peripheral membrane protein complex in the given figure?



(a) P (b) R
(c) Q (d) S

GUJCET-2018

Ans. (b): In the given figure peripheral membrane protein is R and Integral membrane protein is P.

66. Which one of the following is a correct match?
(a) Filariasis - Taenia solium
(b) Encephalitis - Culex vishnui
(c) Malaria - Phlebotomus sp.
(d) Kala - azar - Anopheles Stephensi

WB JEE-2012

Ans. (b) :
Filariasis → *Wuchereria bancrofti*
Encephalitis → Herpes simplex viruses
Malaria → Female Anopheles
Kala-azar → *Leishmania donovani* vector by sand fly (phlebotomus)

67. Schleiden (1838) proposed that cell is the structural and functional unit of life. His idea was a
(a) assumption (b) generalisation
(c) hypothesis (d) observation

UP CPMT-2004

Ans. (c) : Schleider (1838) proposed that cell is the structural and functional unit of life. His idea was a hypothesis. Schleiden defined the cell as the basic unit of plant structure. It is suggested that every structural part of a plant was made up of cells or the result of cells.

68. The cell theory is not applicable to
(a) algae (b) fungi
(c) viruses (d) lichens

Manipal-2011

Ans. (c) : The cell theory is applicable to most living organisms, it does not apply to viruses. Viruses are acellular organisms. They are not composed of cells. They are composed of genetic material (DNA or RNA) surrounded by a protein coat, and they cannot carry out essential like processes on their own, So the viruses fall outside the scope of the cell theory.

69. The replication of DNA is a pre-requisite for a eukaryotic cell to undergo division. During the cell cycle the DNA replicates in
(a) S phase (b) G_1 phase
(c) G_2 phase (d) M phase

AFMC-2007

Ans. (a) : S-phase (phase of DNA synthesis) & DNA replication a normal diploid somatic cell with a 2N complement of DNA at the beginning of S-phase acquires a 4N complement of DNA at its end.

70. All tissues consist of cells sentence was said by:
(a) Wallace (b) Virchow
(c) Schleiden (d) none of these

JIPMER-2003

Ans. (c) : In 1838 Mathias Schleiden a German botanist examined a large number of plant observed that all plants are composed of different kinds of cells which form the tissues of the plants.

71. The study related to the structure and function of a cell is called as:
(a) physiology (b) cytology
(c) histology (d) cellology

JCECE - 2005
Punjab MET -2004
Manipal-2000,2002

Ans. (b) : Cytology is the field that uses the smallest possible tissue sample for diagnosis, reducing criteria as much as possible to the cellular level.

72. Nucleated RBC is present in:
(a) man (b) rat
(c) frog (d) rabbit

Haryana PMT-2005

Ans. (c) : The class of animals known as amphibian includes frogs. Red blood cells in amphibians are nuclear. Their nucleus included DNA, the same genetics material found in every other cell.

73. The smallest free living organism is
(a) virus (b) mycoplasma
(c) diatom (d) cyano bacterium

CG PMT-2009
Haryana PMT-2009

Ans. (b) : The mycoplasma are organisms that completely lack a cell wall. They are the smallest living cell known and can survive without oxygen. Many mycoplasma are pathogenic in animals and plants.

74. Organisms without any specific shape are
(a) mycoplasma (b) bacteria
(c) viruses (d) cyanobacteria

CG PMT-2006

Ans. (a) : Organisms without any specific shape are-Mycoplasma
- Bacteria are the sole members of the kingdom Monera. They are the most abundant micro-organism.
- Cyanobacteria is also known as Blue green algae.

75. Robert Hooke thought of the cells, he observed that:
(a) something similar to veins and arteries of animals for conducting fluid
(b) smallest structural unit
(c) smallest functional unit
(d) unit of heredity

Manipal-2006

Ans. (a) The word "cell" was first used by Robert Hooke in 1665. He compared the cells he observed to the arteries and veins of animals because they contains Juice in live plants.

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76. Mycoplasmas differs from other bacteria in their

(a) DNA (b) RNA
(c) Cell wall (d) Nutrition

CG PMT-2010

Ans. (c) : Mycoplasmas are unique among bacteria because they lack cell wall. Instead of having a rigid peptidoglycan cell wall like most bacteria, they have flexible cell membrane that contains sterols, which provide stability to the cell.

77. Which are the longest cells in the body of man?

(a) Muscle cells of legs (b) Bone cells
(c) Nerve cells (d) None of the above

BVP-2012

Ans. (c) : The longest cell in the human body are nerve cells, also known as neurons. Neurons are the building blocks of the nervous system and are responsible for transmitting information throughout the body.

78. Which of the following theory explain structure of protoplasm?

(a) Surface tension theory
(b) Colloidal theory
(c) Sol-gel theory
(d) Viscosity theory

BVP-2008
Uttarakhand PMT-2007

Ans. (b) : Colloidal theory proposed by Fischer (1894), Hardy (1898), Wilson (1925). According to this theory protoplasm is the polyphasic colloidal system.
The size of colloid particles between more than >.001 μm and less than <.1 μm. Such solute particles called the colloids. e.g – Protein lipids, Milk albumin and solution is called colloidal solution. The colloidal solution has the properties of both true solution and suspension due to the colloidal nature it appears like the jelly like gelatinous viscous and shows elasticity plasticity, contraction, and expansion.

79. Which is correct about cell theory in view of current status of our knowledge about cell structure?

(a) It needs modification due to discovery of sub cellular structures like chloroplasts and mitochondria.
(b) Modified cell theory means that all living being are composed of cells capable of reproducing.
(c) Cell theory does not hold good because all living beings (e.g., viruses) do not have cellular organisation.
(d) Cell theory means that all living objects consists of cells whether or not capable of reproducing.

AIPMT-1993

Ans. (c) : Cell theory does not hold good because all living being do not have cellular organization. This statement is correct about cell theory in view of current status of our knowledge about cell structure. The cell is the basic unit of structure and organization in organisms.

80. The 'Cell theory" states that

(a) all cells have nuclei
(b) cells are the fundamental structural matter of plants and animals
(c) all cells are living
(d) cells reproduce by mitosis and meiosis

CG PMT-2004

Ans. (b) : Cell theory was given by M. Schleiden - (Botanist) and Schwann (Zoologist) (1839) both were German. According to cell theory cell is the structural and functional unit of life, all cells are similar in their chemical composition and metabolism.

81. Witches broom disease is caused by :

(a) fungus (b) phytoplasma
(c) bacteria (d) mineral

Punjab MET-2004

Ans. (b) : Witches brooms are a kind of symptom of plant disease. In this, the plant appears abnormal. Brush - like cluster's s develop is the weak shoots at the same point. The branches may die. It can be caused by a number of pathogens including mites, fungi virus etc. But in the case of potato it is caused by phytoplasma.

C. Outline of Cell

82. Statement I : Mature β-cells synthesis various types of antibodies which are displayed on their membranes.
Statement II : Antigenic site binds to an antibody is called epitope

(a) Both statement I and statement II are true
(b) Both statement I and statement II are false
(c) Statement I is true but statement II is false
(d) Statement I is false but statement II is true

TS EAMCET-09.08.2021 Shift-II

Ans. (a): Mature β-cells can synthesize and display membrane-bound Ig, which is distinct from other lymphocytes. Each mature B-cell clone only secretes one of antibody, which can bind a specific antigen.
The small site on antigen to which a complementary antibody may specifically bind is called an epitopes or antigenic determinant.
Both Statement I and Statement II are true.

83. What will be the genotype of a carrier individual who shows sickle cell anaemic trait

(a) $Hb^B Hb^B$ (b) $Hb^A Hb^S$
(c) $Hb^S Hb^S$ (d) $Hb^A Hb^A$

MHT CET-04.10.2020 Shift-I

Ans. (b) : Sickle cell anaemia is an autosomal linked recessive disease that can be transmitted from parents to the offspring's when both the partners are heterozygous. This disease controlled by single pair of allele, Hb^A and Hb^s.

84. Chemical nature of cellulose is:

(a) Polypeptide (b) polysaccharide
(c) polynucleotide (d) disaccharide

J&K CET-2004

Ans. (b) : Cellulose is a polysaccharide in plant cell wall is made up of cellulose α – D glucose Units, Hemicellulose, (arabinose, Mannose, Xylose, galactose, etc) and pectin (galatose, galacturonic acid and arabinose). Chemical formula of cellulose is $(C_6 H_{10}O_5)_n$.

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85. Match the columns and identify the correct option

Column I	Column II
(A) Thylakoid	**(i) Disc-shaped sacs Golgi apparatus**
(B) Cristae	**(ii) Condensed structure of DNA**
(C) Cisternae	**(iii) Flat membranous sacs in stroma**
(D) Chromatin	**(iv) Infoldings in mitochondria**

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iii)	(iv)	(ii)	(i)
(b)	(iv)	(iii)	(i)	(ii)
(c)	(iii)	(iv)	(i)	(ii)
(d)	(iii)	(i)	(iv)	(ii)

AIPMT (Re-Exam)-2015

Ans. (c) :

Thylakoid – Flat membranous sacs in stroma of chloroplast.

Cristae – Infoldings in mitochondria.

Cisternae – Disc-shaped sacs in Golgi apparatus.

Chromatin – Condensed structure of DNA.

The Thylakoid are arranged into stacked and unstaked regions called grana and stroma thylakoid respectively that are differentially enriched in photosystem I and II complexes.

- Cristae are infoldings in mitochondria, which greatly increases the surface area of the inner membrane.
- Cisternae are disc shaped sacs in Golgi apparatus.
- Chromatin are condensed structure of DNA.

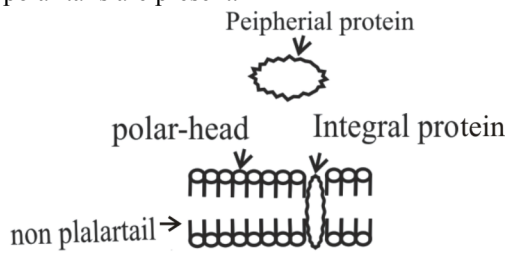
86. In fluid mosaic model of plasma membrane

(a) Upper layer is non-polar and hydrophilic
(b) Polar layer is hydrophobic
(c) Phospholipids form a bimolecular layer in middle part
(d) Proteins form a middle layer

AIPMT-2002

Ans. (c) : Fluid mosaic model of the plasma membrane was proposed by S. J. singer and Garth L. Nicolson .

According to this model, the plasma membrane is a phospholipid bilayer in which the proteins cholestrol and carbohydrates are integrated which give it a mosaic like appearance. In Phospholipids layer upper or outer part like hydrophilic and polar heads of the lipid molecules and inner side of the bilayer hydrophobic & non-polar tails are present.



87. The microscope usually used for seeing living cells or tissues is

(a) compound microscope
(b) electron microscope
(c) phase contrast microscope
(d) light microscope

AIIMS-2012
BVP-2012

Ans. (c) : Phase contrast microscope is used to study dynamic aspects of cells as the cells are living.

- Phase contrast microscopy is based on the principle that small changes in the phase can be transformed into changes in brightness of that object.
- Compound microscope is used for viewing samples at high magnification (40-1000). It contains two types of lenses that function of magnify an object.
- Electron microscope used in biomedical research to investigate the detailed structure of tissues and cells organelles and macromolecular complexes.
- Light microscope are used to view microscopic organism too small to be seen with the naked eye.

88. Genes not located within the nucleus are almost always found in

(a) Cytosol (b) Ribosome
(c) Cytoskeleton (d) Cell membrane

CMC Vellore-2011

Ans. (a) : Genes did not located within the nucleus are almost found in the cytosol. The cytosol is the fluid component of the cytoplasm, and it contains various cellular structures and molecules, including some genetic material, such as mitochondrial DNA.

89. T. Schwann and M Schleiden were :

(a) Dutch biologists (b) Austrian biologists
(c) German biologists (d) English biologists

Haryana PMT-2000
UP CPMT-2001
Haryana PMT-2004

Ans. (c) : Theodore Schwann and Mathias Schleiden were German scientist who made significant contribution to the field of biology. Theodore Schwann (1810-1882) was a German physiologist and one of the founder of the cell theory. He was Born in the city of Neuss, Which was part of the Kingdome of pursia.

Mathias Schleiden (1804-1881) was a German botanist and another important figure in the cell theory. He was born in the city of Hamburg Germany.

90. Read the statements and choose the correct option.

(I) Secretion of interferons is a physiological barrier of innate immunity.
(II) T-lymphocytes are responsible for cell mediated immunity.
(III) Injection given against snake venom is a type of active immunisation.
(IV) Antibodies produced during allergic reactions are of IgA type.

(a) I and II alone are correct
(b) II and IV alone are correct
(c) I alone is correct
(d) II and III alone are correct

@apna_pdf

(e) II alone is correct

Kerala PMT-2013

Ans. (e) : The cell mediated immunity is controlled by the T - Cell. T - lymphocytes initiate the cell mediated immune response by activating the antigen-specific B - cells. T cells have got long life span they are categorized as follows–
Cytotoxic T cells
Helper T cells
Supressor T cells
Memory T cells

D. Types of cell

91. Which of the following is found in animal cell?
(a) Plasmodesmata (b) 80 S ribosomes
(c) Centriole (d) All of these

VMMC-2011

Ans. (c) : Centrioles are small cylindrical, cellular structures found in eukaryotic cells (Animal cells). They play vital role in cell division and are essential components of the centrosome. Centrosomes are regions of the cell where microtubules are organized, and they serves as important centre for cell division.

92. Difference between prokaryote and eukaryote is:
(a) In cell size
(b) In cell shape
(c) In chemical composition of protoplasm
(d) In organization of nuclear material

Rajasthan PMT-2004

Ans. (d) :

Prokaryotic cell	Eukaryotic cell
(1) Cells that lack a well defined nucleus are called prokaryotic.	(1) Cells having a well-defined nucleus are called eukaryotic cells.
(2) Prokaryotic cells do not have membrane-bound nuclei or organelles.	(2) They contain a nucleus and organelles which are bounded by plasma membrane.
(3) They are unicellular Organisms.	(3) They are usually multicellular organisms

Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

93. Idioblast is : (1) plant cell different from others (2) animal cell different from others (3) plant cell having cell inclusions (4) animal cell having cell inclusions
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2008, 2005

Ans. (d) : An idioblast is isolated plant cell that differs from neighboring tissues. They have various functions such as a storage of reserves excretory materials, pigments and minerals. They could contain oil, latex, gum, resin, tannin or pigments etc. Most commonly idioblasts are storage cells.
These cells can be classified into three types on the basis of their function –
(1) Excretory Idioblast
(2) Tracheoid Idioblast
(3) Sclerenchymatous Idioblast

94. Animal cell differ from plant cell in possessing
(a) Vacuoles (b) Centrosomes
(c) Plastids (d) Mitochondria

JIPMER-2013
Haryana PMT-1999

Ans. (b) : Animal cell differs from plant cell in possessing centrosome. Centrosome participates in the formation of spindle apparatus during cell division. Animal cells and plant cells both contain a few common constituents like the nucleus, cell membrane and cytoplasm.
The centrosome is a microtubule organizing center found near the nuclei of animal cells.

95. Which is the largest body cell?
(a) Neurons (b) RBCs
(c) Osteocytes (d) Sperms

Haryana PMT-2003

Ans. (a) : Nerve cells or Neurons are the longest body cells. These cells make up the nervous system of our body. These cells are therefore found in the brain and the spinal cord.

96. The organelles which play an important role in the formation of cell plate are:
(a) microtubules (b) endoplasmic reticulum
(c) ribosomes (d) Golgi complexes

AP EAMCET-2000

Ans. (d) : Golgi vesicles play an important role in cell plate formation during cytokinesis of plant cells. The number of Golgi bodies is generally 9 to 10 in a plant cell but is very high in cell engaged in the secretory activity and rapid division. The heavy dependence of cell plate formation on active Golgi stocks explains why plant cells, unlike animal cells, do not disassemble their secretion machinery during cell division.

97. Alginic acid is found in the cell wall of
(a) Gigartina (b) Laminaria
(c) Gelidium (d) Scytonema

CMC Vellore-2009

Ans. (b) : Laminaria is a brown algae. Food is stored as complex carbohydrate which may be in the form of laminarin or manitol.
• The vegetative cells have a cellulosic wall usually covered on the outside by a gelatinous coating of alginic acid.

98. Cell wall of a cell is removed, the remaining is called
(a) etioplast (b) aleuroplast
(c) amyloplast (d) protoplast

BCECE-2004

Ans. (d) : A plant cell without a cell wall is called a protoplast. The cell wall providing structural support and protection when the cell wall is removed, the remaining cell, containing the cell membrane and its contents is referred to as protoplast. Protoplast are commonly used in laboratory research for various purposes such as genetic information and fusion with other protoplast to create hybrid cells.

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99. Which of the following cells of Leucosolenia sponge is self replicating and capable of giving rise to all other types of cells?

(a) Amoebocyte (b) Chromocyte
(c) Choanocyte (d) Collenocyte

AMU-2002

Ans. (a) : Leucosolenia:-
(1) Leucosolenia is simplest, marine, fixed, cylindrical and colonial sponge.
(2) It is radially summetrical & found in shallow sea water.
- Its mesenchyma has numerous irregular amoebocytes which may be following types.
- Archaeocytes:- Undifferentiated totipotent cells that have the potency to develop into other types of cells.
- Chromocytes:- Pigment cells.

100. Which of the characters are found in cells producing primary tissues ?

(I) Rich in protoplasm, conspicuous nucleus
(II) Thick cell wall, few plasmodesmatal connections
(III) Thin cell wall, many plasmodesmatal connections
(IV) Lignin in cell wall, inconspicuous nucleus

(a) (I, II) (b) (I, IV)
(c) (I, III) (d) (III, IV)

TS EAMCET-2015

Ans. (c) : The primary meristematic tissues are indeed derived from the promeristem or the embryonic meristem. They are indeed roughly spherical polyhedral, or rectangular in shape with thin primary cell walls, which consist mainly of cellulose and lack a secondary wall the dense cytoplasm with a prominent nucleus is typical of actively dividing cells as seen in meristematic tissues. Plasmodesmata are specialized channels or pores that connecting adjacent cell and facillating communication and transport of materials between them.

101. Which of the following structure is not found in a prokaryotic cell?

(a) Plasma membrane (b) Nuclear envelope
(c) Ribosome (d) Mesosome

AIPMT (Re-Exam)-2015

Ans. (b) : The nuclear envelope, also known as the nuclear membrane, is made up of two lipid bilayer membrane that in eukaryotic cells surround the nucleus, this nucleus envelope absent in prokaryote and genetic material is naked, laying in cytoplasm.
They however possess ribosome, mesosome and plasma membrane.
In prokaryote mesosome is a convoluted membranous structure formed in a prokaryote cell. By the invagination of plasma membrane.
These extention help in the synthesis of the cell wall and replication of DNA.
They help in equal distribution of chromosome into the daughter cells.
Mesosomes helps in secretion process as well as bacterial respiration.

102. The thickness of unit membrane is

(a) 20 Å (b) 35 Å
(c) 55 Å (d) 75 Å

BVP-2009

Ans. (d) : Cell membrane contain two lipid layers and two protein layers. Formula - PLLP (protein, lipid, lipid ,Protein) but as trilamillar or tripartite outer protein layer both are 20Å in thickness and lipid bilayer 35Å in thickness thus totals of the cell membrane approximately 75Å.

103. Match the following and choose the correct combination from the options given.

Column - I Cell type		Column - II Size	
A.	**Viruses**	**i.**	**1-2μm**
B.	**PPLO**	**ii.**	**10-20μm**
C.	**Eukaryotic cell**	**iii.**	**About 0.1μm**
D.	**Bacterium**	**iv.**	**0.02-0.2μm**

(a) a – 1, b – 2, c – 3, d – 4
(b) a – 4, b – 3, c – 2, d – 1
(c) a – 1, b – 3, c – 2, d – 4
(d) a – 4, b – 2, c – 3, d – 1
(e) a – 3, b – 4, c – 2, d – 1

Kerala PMT-2013

Ans. (b) : Viruses – 0.02 – 0.2 μm
PPLO – About 0.1 μm
Eukaryotic cell – 10 – 20 μm
Bacterium – 1 – 2μm

E. Prokaryotic Cell

104. Given below are two statements :
Statement I : In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.
Statement II : In eukaryotes, the negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.
In the light of the above statements, choose the correct answer from the options given below :

(a) Statement I incorrect but statement II is true.
(b) Both Statement I and Statement II are true.
(c) Both Statement I and Statement II are false.
(d) Statement I is correct but Statement II is false.

NEET (UG) 07.05.2023

Ans. (a) : The prokaryotes such as E.Coli do not have a defined nucleus in spite of this their DNA is not scattered throughout the cell.
- The negatively charged DNA is held with some positively changed proteins in a region called as nucleoid.
- The negatively charged DNA is wrapped around the positively changed histone octamer to form a structure called nucleosome.

105. Nucleoid is _____.

(a) chromatin material off eukaryotic cells.
(b) nuclear sap of eukaryotic cells.

@apna_pdf

(c) prokaryotic chromosome associated with proteins.
(d) spherical, acidophilic body present within distinct nucleus.

MHT CET-07.10.2020 Shift-I

Ans. (c) : Prokaryotes can be split into two domains; archaea and bacteria. In prokaryotic cell the intercellular water-soluble components; protein, DNA and metabolites are located together in the cytoplasm enclosed by the cell membrane rather than is separate cellular components.
And nucleoid is unevenly shaped portion that stores genetic material and is found in prokaryotic organisms.

106. Following are prokaryotic cells EXCEPT____

(a) Anabaena (b) Streptococcus
(c) Nostoc (d) Paramecium

MHT CET-04.10.2020 Shift-I

Ans. (d) : Prokaryotes are generally smaller and differ from processes eg, bacteria, blue green algae (Cynodbateria) archaic, mycoplasma etc.
Eukaryote is an organism (Unicellular or multicellular) Whose cells contain a true nucleus. Eg, Protozoa other algae metaphyta and metazoan.
Paramecium is a eukaryote it has well organized cells.

107. Genome of a prokaryotic cell is _____

(a) genes contained in diploid number of chromosomes
(b) total number of genes present in the chromosome
(c) total number of genes on sex chromosome
(d) genes contained in the plasmid

MHT CET-01.10.2020 Shift-I

Ans. (b) : While most prokaryotes like E. coli contain a single circular DNA molecule that makes up their entire genome recent studies have indicated that some prokaryotes contain as many as four linear or circular chromosome. For ex – *Vibrio chlerae* the bacteria that cause cholera, contains two circular chromosomes.

108. Choose the correct statement

(A) Mesosomes are exterior extensions of plasma membrane outside the cell
(B) In prokaryotic cells filamentous extensions of cell walls are called flagella
(C) The membrane of erythrocyte has nearly 70% protein and 20% lipids
(D) The Mitochondria, Chloroplast and peroxisomes are not co-ordinated with endomembrane system

Options:

(a) B, D (b) C, D
(c) B, C (d) A, D

AP EAMCET-25.04.2018 Shift-II

Ans. (a) : Flagella are primarily used for cell movement and are found in prokaryotes as well as some eukaryotes. The prokaryotic flagellum spins, creating forward movement by a corkscrew shaped filament.
Mesosomes are ingrowths from plasma membrane inside the cell.
The membrane of erythrocyte has nearly 52% protein and 40% lipids
Mitochondria, chloroplast and peroxisomes are not the part of endomembrane system because their function is not coordinated.

109. During mitosis, nuclear membrane disappears at

(a) telophase (b) late prophase
(c) late metaphase (d) anaphase

Tripura JEE-2017

Ans. (b) : In late prophase, the nuclear envelope starts to fragment, and by the time of prometaphase, it completely dissolves, allowing the mitotic spindle to interact with the chromosomes. This breakdown of the nuclear membrane is essential for the proper segregation of genetic material during mitosis.

110. The type of ribosome found in prokaryotic cell is

(a) 60 S (b) 70 S
(c) 80 S (d) 100 S

Tripura JEE-2017
Karnataka CET- 2011

Ans. (b) : Ribosome observed in plant cell. by 'Robinson and Brown.' But palade : observed in Ribosomes animal cell the ribosomes occurs in both prokariyotic and eukaryotic cell except mature R.B.C also occur in the nucleus, nucleolus, chloroplast; mitochondria. i.e organelle within the organelles. 2 types ribosome 70S ribosome's (larger sub unit 50 S + smaller unit 30 S). These ribosome's are found in prokaryotes. 80S ribosome (larger subunit 60 S + Smaller subunit 40 S). These ribosome's are found in Eukaryotic cells.

111. Identify the bacterium that appears violet after Gram staining

(a) Salmonella enterica
(b) Escherichia coli
(c) Mycobacterium tuberculosis
(d) Rhizobium meliloti

WB JEE-2012

Ans. (c) : Gram staining technique is based on the ability of bacteria to retain the crystal violet stain in their cell wall. Gram staining includes staining of both gram positive and gram-negative bacteria cell purple with crystal violet followed by stabilization of dye in peptidoglyacan layer with mordant gram's iodine and application of alcohol to dissolve outer membrane and dye from peptidoglyacan layer. Presence of thick petptidoglycan layer in gram positive cells make them retain the dye after alcohol treatment while gram-negative bacteria become colourless.

112. Pili in bacteria represent :

(a) flagella
(b) cilia
(c) extrachromosomal genetic element
(d) outgrowth of cell membrane of donor cell

BHU PMT-2001

Ans. (d) : Sex Pili structure are minute surface appendage which are found in some bacteria like E coli there surface appendages has special function.
It is made up of protein. They are involve the process of conjugation there synthesis depends upon the presence of conjugative genes which are found sex factor plasmid or factor plasmid.

@apna_pdf

113. In many bacteria, the cell membrane becomes invaginated and folded to form:
(a) Pili (b) Cristae
(c) Fimbriae (d) Mesosomes

Haryana PMT – 2003
Uttarakhand PMT-2004
Manipal - 2004

Ans. (d) : Mesosomes (Prokaryotic Mitochondria) was discovered by filzgam.
The invigination of cell membrane or plasma membrane it contains enzyme of replication, respiration due to the presence of these enzyme mesosome are called as mitochondria of the prokaryotes or power house of prokaryotes.
Function of mesosomes :-
(1) It in involved in the replication of DNA.
(2) It take part in respiration.
(3) It is involved in septum formation during binary fission.

114. A prokaryotic cell lacks
(a) True nucleus
(b) Nuclear membrane
(c) Membrane bound organelles
(d) All of the above

MGIMS Wardha-2010
WB JEE-2006
AFMC-2003

Ans. (d) : Prokaryotic cell are the primitive cells which are found in the early formed life on earth. A prokaryotic cell lacks a true nucleus, nuclear membrane and membrane bound organelles.

115. Assertion : Prokaryotic genome consist of a single circular DNA molecule.
Reason : Genetic variations do not occurs in Prokaryotes.
(a) If both assertion and reason are true and reason is the correct explanation of assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) If assertion is true but reason is false.
(d) If both assertion and reason are false.

VMMC-2008

Ans. (c) : The assertion is true. Prokaryotic genome consist of a single circular DNA molecule, which is found in organisms like bacteria.
However the reason is false. Genetic variation do occur in prokaryotes. Prokaryotes can undergo various mechanisms of genetic variation, such as mutation horizontal gene transfer (ex-conjugation, transformation and transduction) and recombination.

116. The outer face of the outer membrane of Gram negative bacteria contains
(a) Peptidoglycans (b) Teichoic acid
(c) Lipopolysaccharides (d) Mycoic acid

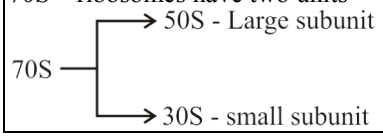
BCECE-2009

Ans. (c) : Gram negative bacteria have a thin peptidoglycon cell wall that is surrounded by a outer membrane containing lipopolysaccharides (LPS). This outer membrane is an important component of Gram-negative bacteria and provides them with additional protection and unique properties.

117. 70S ribosomes have two units. These are
(a) 50S + 30S (b) 40S + 30S
(c) 50S + 20S (d) 40S + 60S

BCECE-2009
J&K CET-2008

Ans. (a) : Ribosomes are of two types, 70 S and 80 S. 70 S ribosomes are present in prokaryotic cells and 80 S ribosomes are present in eukaryotic cells.
70S – ribosomes have two units



118. Respiratory mesosomes are also known as
(a) Mitochondria of bacteria
(b) Chondrioids
(c) Store house of respiratory enzyme
(d) All of the above

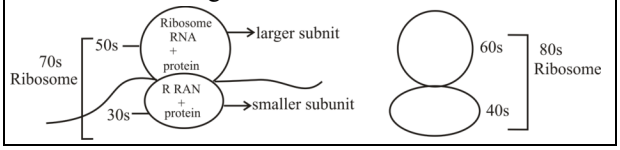
Haryana PMT-2011

Ans. (d) : Respiratory enzymes are located at the cell membrane or plasma membrane of prokaryotes. Mesosomes are the finger like infoldings of the cell membrane in bacterial cells.
Respiratory mesosomes are also known as Mitochondria of bacteria, Chondrioids, Store house of respiratory enzyme.

119. What is true about ribosomes?
(a) These are found only in eukaryotic cells
(b) These are self-splicing introns of some RNAs
(c) The prokaryotic ribosomes are 80S where 'S' stands for sedimentation coefficient
(d) These are composed of ribonucleic acid and proteins

AIPMT (Screening)-2012

Ans. (d) : Ribosome is a small spherical body within a living cell that is the site of protein synthesis and are composed of ribonucleic acid and proteins.
- Ribosome have 2 subunit that is 70S and which is present in prokaryotic cell consist to unit one larger and one smaller.
- 80S ribosome are found in eukaryotic cell where 'S' denotes Svedberg unit.



120. Genetic material of prokaryotic cell
(a) Non histonic double stranded DNA
(b) Histonic double stranded DNA
(c) Histone & DNA both are absent
(d) Histone without DNA

AIPMT-1999

Ans. (a) : Prokaryotic cells, such as bacteria, do not have a membrane- bound nucleus and lack histones, which are proteins that packages and organize DNA in eukaryotic cells, In prokaryotic cells, the genetic material is typically in the form of non-histonic double stranded DNA that floater freely in the cytoplasm.

@apna_pdf

121. Exponential growth is shown by
(a) Unicellular forms
(b) A cell in tissue culture
(c) Embryo
(d) Multicellular plants

AIPMT-1999

Ans. (b) : During the log phase of growth in tissue culture, cells typically exhibit exponential growth this means that the number of cells doubles at regular intervals, leading to rapid increase in cell population.

122. Prokaryotic cells occur in:
(a) PPLO (b) bacteria
(c) cyanobacteria (d) all of these

J&K CET-2002

Ans. (d) : (Greek : Pro - Primitive + karyon - nucleus)
Here primitive or ill defined or incident nucleus is present eg in bacteria, blue green algae (lyxophyceae or cyano phycease or cynobacteria) and PPLO (Pleuro pneumonia like organism) i.e. akaryobionta.
The most extensively studied prokaryote is E. coli. Common bacterium found in intestine of human beings.

123. Broad spectrum antibiotics are those which :
(a) acts on all bacteria and viruses
(b) is effective in very small amounts
(c) acts on both pathogen and host
(d) acts on a variety of pathogenic

Uttarakhand PMT-2006

Ans. (d) : Broad spectrum antibiotics are medications that are effective against a wide range of bacteria, including both Gram positive and Gram negative bacteria. They are not specific to a particular type of bacteria, making them useful when the exact cause of the infection in unknown.

124. Consider the following statements
A. In prokaryotic cells, a special membranous structure formed by the extension of the plasma membrane into the cell is known as polysome
B. The smooth endoplasmic reticulum is the major site for synthesis of glycoproteins
C. RuBisCO is the most abundant protein in the whole of biosphere
D. Mitochondria, chloroplasts and peroxisomes are not considered as part of endomembrane system
Of the above statements
(a) C and D alone are correct
(b) A and B alone are correct
(c) B and C alone are correct
(d) A and D alone are correct
(e) B and D alone are correct

Kerala PMT-2012

Ans. (a) : RuBisCO (Ribulose-15 Biphasphate carboxylase/oxygenase)
Which is bifunctional or Dual in nature. It has affinity with CO_2 and functions as carboxylation and also has affinity with O_2 and act as oxygenation it is most Abundently found on the earth. An about 16% protein of total chloroplast.
Functions of mitochondria, chloroplast and peroxisomes are not coordinated with ER, Golgi complex: lysosomes and vacuoles. Hence these are not considered as a part of the end membrane system.

125. Scientific name of green gram is
(a) Vigna mungo (b) Vigna radiata
(c) Phaseolus mungo (d) Phaseolus sinensis

JCECE-2010

Ans. (b) : The scientific name of green gram is *Vigna radiata*. At is the angiospermic plant belonging to the legume called fabaceae.

126. Which one of the following is not an inclusion body found in prokaryotes ?
(a) Cyanophycean granule
(b) Glycogen granule
(c) Polysome
(d) Phosphate granule

AIPMT-2015

Ans. (c) : Polysome is not an inclusion body found in prokaryotes. Polysome is an aggregation of ribosomes formed under conditions of high concentration of magnesium. An inclusion body is any of various particulate structure. Usually proteins, formed after viral infections in a prokaryotic or eukaryotic cell.
Cell inclusions are considered various nutrient or pigments that can be found within the cell.
Example - Cynophycean granule, Glycogen Granule and phosphate granule.

127. In prokaryotes, chromatophores are
(a) Specialized granules responsible for coloration of cells
(b) Structures responsbile for organizing the shape of the organism
(c) Inclusion bodies lying free inside the cells for carrying out various metabolic activities
(d) Internal membrane systems that may become extensive and complex in photosynthetic bacteria

AIIMS-2006

Ans. (d) : In prokaryotes chromatophores are internal membrane systems that can become extensive and complex in photosynthetic bacteria, these specialized membrane structures house the pigment and other components necessary for photosynthesis, enabling these bacteria to capture and convert light energy into chemical energy.

128. The outermost limiting layer of mycoplasma is made up of:
(a) Cell wall (b) Cell membrane
(c) Mucilaginous sheath (d) Slime layer

AIIMS-2009

Ans. (b) : Mycoplasma is a genus of the kingdom monera and smallest bacteria. Its outer limiting layer is formed of cell membrane. They do not have cell wall around the cell membrane So, their cell lack a specific shape. In the absence of a cell wall, they are found to be resistant to many antibiotics like penicillium.
• Plants and cyanobacteria show the presence of mucilaginous sheath which made up of thick gluey substance called **mucilage**.

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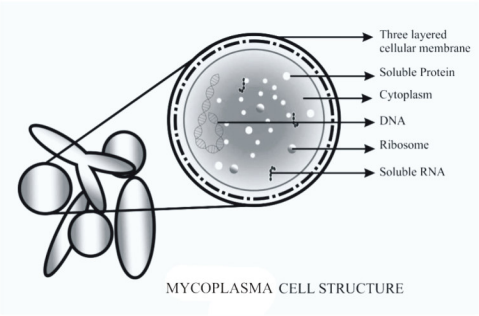
• Slime layer is loosely associated glycoprotein layer which is present outside the cell wall.



MYCOPLASMA CELL STRUCTURE

129. The cells of the bacterium Streptococcus remain arranged in the form of

(a) chain (b) irregular cluster
(c) cube (d) plate

CG PMT-2005

Ans. (a) : Streptococcus bacteria are a type of spherical bacteria which is found in chain. The classification of streptococcus is done on the basis of the blood. Hemolysis – alpha hemolysis beta hemolysis and gamma hemolysis vibrio bacteria are comma-shaped bacteria.

130. In a bacterial cell, the organelle with respiratory enzymes is

(a) mitochondria (b) chondrisome
(c) mesosome (d) centrosome

CG PMT-2005

Ans. (c) : In a bacterial cell, the organelle with respiratory enzymes it the mesosomes. Mesosomes are invagination of the plasma membrane in prokaryotic cells, and they are involved in various functions, including respiratory processes like aerobic respiration and energy production.

131. The genetic material of prokaryotic cells is called

(a) nucleus (b) nucleolus
(c) nucleoide (d) centrosome

CG PMT-2005

Ans. (c) : A nucleoid is an irregularly shaped region in a prokaryotic cell. The genetic material of prokaryotes is circular type of DNA present in the cell centre called Nucleoid. The cell is devoid of a proper nucleus and cell organelles. Since there is no nucleus the cell is attached to cell membrane and is in direct contact with the cytoplasm.

132. In which, mitosis does not occur?

(a) Green algae (b) Fungi
(c) Bacteria (d) higher plants

CG PMT-2005

Ans. (c) : Mitosis or mitotic division is meant for multiplication of cells. Mitosis generally takes place in vegetative or somatic cells. It creates two indentical daughter cells from one mother cell. Cell must have nucleus to undergo mitosis. A fertilized egg undergoes number of mitotic division to from zygote

In plants mitosis occurs in the meristematic cell mitosis does not occurs in bacterial cell as bacterial cell does not have a nucleus.

133. Intracellular compartments are not found in the cells of

(a) lower plants (b) prokaryotes
(c) higher plants (d) eukaryotes

WB JEE-2007

Ans. (b) : Intracellular compartments are not found in the cells of prokaryotes. Prokaryotic cells lack membrane-bound organelles , which are characteristic features of eukaryotic cells.

134. Mesosome in a bacterial cell is :

(a) plasmid
(b) connection between two cells
(c) plasma membrane infolded for respiration
(d) none of these

Manipal-2005

Ans. (c) : The mesosome is an enfolding of the bacterial cell membrane found in some bacterial species. It plays role in cellular respiration and is involved in increasing the surface area for enzymatic reactions, much like the function of eukaryotic mitochondria.

135. In prokaryotes the Glycocalyx when it is thick is called

(a) Slime layer (b) Mesosome
(c) Capsule (d) Cell wall

Karnataka CET-2015

Ans. (c) : In prokaryotes, when the glycocalyx is thick and thick and well- organized it is called a capsule. The capsule is a protective layer outside the cell wall, and it helps the bacterium evade the host immune system and aids in attachment to surfaces.

On the other hand, a thin and unorganized glycocalyx is known as a slime layer. Mesosomes are imagination of the cell membrane and are not related to the glycokalyx.

136. Following is not present in prokaryotic cell

(a) Smooth ER (b) Mitochondria
(c) Golgi body (d) All of the above

Rajasthan PMT-1995

Ans. (d) : The absence of intercellular compartmentalization indicates the primitive nature of prokaryotic cell. Prokaryotes are the organism belonging to kingdom monera and consists of cell types of bacteria absence of nuclear membrane and other membrane bound organelles such as mitochondria, endoplasmic reticulum, Golgi apparatus, vacuoles and lysosome.

137. Extension of plasma membrane in prokaryotic cell is

(a) mesosome (b) hapnoid
(c) ribosome (d) none of these

DUMET-2007

Ans. (a) : Mesosome or chondrioid are formed due to invagination of the plasma membrane of bacteria serve as the respiratory centre.

Prokaryotic cells are devoid of membrane - bound organelles like the nucleus, mitochondria; ER etc

Mesosomes are more prevalent in gram +ve bacteria and they are rich in respiratory enzyme of prokaryotic cell. The ribosome is the nonmembrane bound organelle hence is present in a prokaryotic cell but it is not formed due to the extension of the plasma membrane.

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138. In the animal body blood bank is:

(a) heart (b) spleen
(c) lungs (d) liver

JCECE-2004

Ans. (b) : Spleen is located behind the stomach and below the lungs. It stores blood and helps in flighting serious inflection it is the part of lymphatic system. The Spleen play importance roles in regard to red blood cell and the immune system it removes old red cell and holds a reserve of blood, which can be valuable in case of hermorrhagic shock, blood loss and also recycles iron. It purifies the blood and helps the immune system to recognize and attack foreign antibodies and disease. The spleen is composed of the red and white pulp. White pulp producers and grows immune cell as well as blood cell, and other purifying blood.

139. Which of the following is always absent in prokaryotic cells?

(a) Ribosome (b) Mitochondria
(c) DNA (d) Cell wall

WB JEE-2014

Ans. (b) : In prokaryotic cells mitochondria is always absent. Prokaryotic is primitive type cells which lack membrane bound structure and well developed nucleus.

140. Shorter generation time of E. coli compared to eukaryotes may be explained on the basis of

(a) Shape
(b) Large surface : volume ratio
(c) Presence of cell wall
(d) Absence of organelles

WB JEE-2008

Ans. (b) : The most extensively studied prokaryote is E. coli a common bacterium found in intestine of human being prokaryotes have large. Surface area to volume ratio and it is responsible for their high metabolic rate, high growth rate and short generation time. This helps them to have a shorter generation time of the doubling time as compared to the eukaryotes.

141. Select the wrong statement of bacterial cell

(a) Mesosome is formed by the extensions of plasma membrane into the cell.
(b) The pili are elongated tubular structures made up of a protein.
(c) Flagellum is composed of filament, hook and basal body.
(d) Ribosomes are about 30 nm by 50 nm in size.
(e) The fimbriae are small bristle like fibres sprouting out of the cell.

Kerala PMT-2013

Ans. (d) : Fimbriae are finger like projections on the ends of fallopian tubes closest to ovaries. Mesosome is formed by extensions of plasma membrane into the cell. The pili are elongated tubular structure. Flagellum is composed of filament, hook and basal body.

F. Eukaryotic Cell

142. Plasmid is

(a) Small extra chromosomal circular self replicating DNA that can carry genes into host organism
(b) Bacteriophage
(c) DNA found in mitochondria
(d) DNA incorporated in bacterial chromosome

BVP-2012
Haryana PMT-2006, 2004, 2003
Manipal-2003

Ans. (a) : Plasmid is extra chromosomal or extranuclear genetic material found mostly in bacteria or prokaryotes. It is made up of ds-circular DNA. usually one in number but it can be more.
Plasmid is semiautonomous & self replicating (Ori sequence or genes are present)

143. Assertion (A): Eukaryotic cells have the ability to adopt a variety of shapes and carry out directed movement.
Reason (R): Micro filament, microtubules and intermediate filaments, constitute the cytoskeleton.

(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A.
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : The cytoskeleton is a fibrous or fine tubular structure which constitute the supportive structure of the cell. The cytoskeleton is made up of three elements. Within the cell, they are-Microtubule made up tubulin protein microfilaments made up actin and intermediate filament madeup of structural protein e.g., keratin, vimentin and desmin.

- Cytoskeleton helps the cell maintain its shape and gives support to the cell.
- The cytoskeleton assists in the transporation of communication signals between cells. It forms cellular appendage like protrusions, such as cilia and flagella in some cells.
- Eukaryotic cells have the ability to adopt a variety of shapes and carry out directed movement.

144. The extra food is stored in this form in eukaryotic, multicellular heterotrophs.

(a) Starch (b) Glucose
(c) Glycogen (d) Amino acids

TS EAMCET-11.05.2023, Shift-II

Ans. (c) : Food is stored in the form of glycogen in animals where as, in the form of starch in plants.

145. What are the differences between plant cell and animal cell among the following ?

(A) Cell wall
(B) Cell membrane
(C) Ribosomes

@apna_pdf

(D) Centrioles
(E) Large central vacuole
(F) Plastids
(a) A, B, F only (b) B, C, D, E only
(c) A, B, E, F only (d) A, D, E, F only

TS EAMCET-30.07.2022 Shift-II

Ans. (d) : Cell membrane, ribosomes and mitochondria are common organelles in both plant and animal cells.
Cell wall, large central vacuole and plastids are organelles which found only in plant cells. Centrioles only found in animal cells.

146. One of the following cell organelles is involved in synthesis and storage of fat.
(a) Glyoxysome (b) Peroxisome
(c) Sphaerosome (d) Ribosome

MHT CET 5.10.2020 Shift-I

Ans. (c) : In seeds of some plants such as castor or bean seeds the reserve material is stored in lipid containing bodies known as sphaerosomes. These are very small, spherical bodies with single unit membrane.
• Their main functions are collection translocation and synthesis of fatty substances.

147. Choose the correct statements
(A) Polar molecules cannot pass through non-polar lipid layer since they require carrier proteins.
(B) The plant cell vacuole plays role in osmoregulation.
(C) Golgi apparatus is the site of synthesis of proteins and glycolipids.
(D) Plasmid DNA shows resistance to antibiotics .
(E) On cell maturation, secondary wall is formed as deposition towards the outside the primary wall.
(a) A, B, C only (b) A, B, D only
(c) B, C, E only (d) C, D, E only

TS EAMCET-29.09.2020 Shift-I

Ans. (b) : Polar Dissolves in polar, while non polar dissolves in non polar. So, polar cannot pass through non polar lipid baries in cell membrane.
Vacuole is the store house of water, minerals, salts and ions and its concentration decided the osmoregulation of the cell.
Plasmid DNA shows resistance to antibiotics.

148. Which of the following pair of organelles does not contain DNA?
(a) Chloroplast and Vacuoles
(b) Lysosomes and Vacuoles
(c) Nuclear envelope and Mitochondria
(d) Mitochondria and Lysosomes

NEET-2019

Ans. (b) : Lysosomes are single membrane bound organelle consisting of hydrolytic enzymes, vacuole are large membranous sac, and both Lysosome and vacuoles do not contain DNA. Mitochondria and chloroplast contain their own DNA, so they are also called semi autonomous organelles.
• Lysosome are membrane enclosed organelles that contain an array of enzymes capable of breaking down all type of biological polymers protein nucleic acid, carbohydrates and lipids.
• Vacuoles help maintaining of water balance, sometimes a single vacuole can take up most of the interior space of the plant cells.

149. Which one is only found in plant?
(a) Ribosome (b) Mitochondria
(c) Glyoxysomes (d) Lysosome

JIPMER-2019

Ans. (c) : Glyoxysomes is only found in plant.
• Glyoxysomes are special types of plant peroxisome containing glyoxylate cycle enzyme. Glyoxysome helps in degradation of the lipid residues which are present in plant cells this is required at seed germination. Special fat storing tissue contain–glyoxylate cycle enzyme which is the process of conversion of Acetyl Co-A into succinate. Glyoxysome were discovered by Beevers and Breidenbench.

150. Functions not associated with peroxisomes
i. Converstion of stored lipids to carbohydrates
ii. Catabolism of fatty acids
iii. Involve in photophosphorylation
iv. Production of Hydrogen peroxide
v. Synthesis of phospholipids
The correct answer is
(a) i, iii, iv (b) ii, iii, iv
(c) ii, iv, v (d) iii, v

AP EAMCET-25.04.2018 Shift-II

Ans. (a) : Functions of peroxisome-
1. In C_3 plants concerned with the photorespiration.
2. In animals concerned with lipid metabolism, amino acid, uric acid oxidation.
3. β oxidation of fatty acid.
4. In Brain tissue phospholipid synthesis and in liver cells cholesterol and bile acid synthesis.

151. H_2O_2 is converted to water and oxygen by an enzyme which is present in the cellular organelle.
(a) Glyoxysome (b) Peroxisome
(c) Lysosome (d) Ribosome

TS EAMCET-02.05.2018 Shift-II
DUMET-2001

Ans. (b) : Peroxisome are single unit membrane bound organelle which has dense and granular stroma containing urate oxidase, Deamino oxidase, α- hydroxy acid oxidase, β- hydroxy acid oxidase which produce the H_2O_2 which is highly reactive toxic oxydising agent.
Glycolate oxidase convert into glycolate and catalase enzyme.
catalage enzyme converted H_2O_2 into H_2O and O_2.

152. Catabolism of long chain fatty acids occur in
(a) Glyoxysomes (b) Peroxysomes
(c) Carboxysomes (d) Ribosomes

TS EAMCET-12.05.2017

Ans. (b) : The catabolism of long-chain fatty acids occurs in peroxysomes. These organelles contain enzymes involved in fatty acid oxidation, which breaks down long chain fatty acids to generate energy.

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153. Which cellular components are found in mycoplasma, spirochaetes and rickettsias?
(a) DNA (b) RNA
(c) Ribsomes (d) All of these
VMMC-2011

Ans. (d) : All three bacterial groups, Mycoplasma, spirochaetes and rickettsias. Contain DNA, RNA and ribosomes.

154. In protoplasm fat store in the form of:
(a) polypeptide (b) triglyceride
(c) polysaccharide (d) nucleosides
Rajasthan PMT-2004

Ans. (b) : In protoplasm fat is stored in the form of triglycerides. Triglycerides are a type of lipid molecule and the most common form of fat storage in living organism, including plants and animals. They play a crucial role in energy storage and transportation within body.

155. Which of the following statement is not true ?
(a) Animal cells never contain chloroplast unlike many plant cells
(b) Animal cells contain ultrascopic chloroplast while plant cells contain microscopic chloroplast
(c) Plant cells have cellulosic cell wall while animal cells do not
(d) Plant cells have central vacuoles while animal-cells do not
Uttarakhand PMT-2007

Ans. (b) : Animal cells contain ultrascopic chloroplast while plant cells contain microscopic chloroplast. This statement is not true. Animal cells do not contain chloroplast at all, regardless of their size, while plant cells contain chloroplasts that are responsible for photosynthesis and are typically microscopic in size.

156. Which of the following is a part of endomembrane system of eukaryotic cell?
(a) Peroxisomes (b) Chloroplasts
(c) Mitochondria (d) Golgi complexes
J&K CET-2008

Ans. (d) : The endomembrane system include endoplasmic reticulum Golgi complexs, lysosomes and vacuoles. Since the function of the mitochondria, chloroplast and peroxisomes are not coordinated with the above components these are not considered as part of the endomembrane system.

157. Microfilaments in eukaryotic cells are made up of
(a) Actin (b) Albumin
(c) Globulin (d) Fibrin
DUMET-2010

Ans. (a) : Microfilaments, also known as actin filaments, are thin, double-helical cylindrical rods made of actin protein found in eukaryotic cells. They play essential roles in cell motility, cell division and maintaining cell shape in both muscle and non-muscle cells.

158. Which of the following does not contain DNA?
(a) Mitochondria (b) Chloroplast
(c) Peroxysome (d) Nucleus
VMMC-2011
Uttarakhand PMT-2009
BHU PMT (Screening)-2009

Ans. (c) : In the nucleus, the chromatin material is found which is organization of DNA and proteins mitochondria and chloroplast also posses extra chromosomal DNA while DNA is absent in peroxysome.

159. Muramic acid is present in the cell wall of
(a) bacteria (b) green algae
(c) red algae (d) rhizopus
CG PMT-2007

Ans. (a) : In Prokaryotes the cell wall is made up of mucopeptide or murein or peptidoglycan this compound is present in both Eubacteria & cyanobacteria.
The mucopeptide consists of alternative unit of
(1) N-Acetyl Glucosamine (NAG)
(2) N-Acetyl muramic acid (NAM)
Both the alternating unit connected by β-1,4- glycoside bond. The different chain of NAM & NAG are inter connected by tetra peptide linkage which consists of 4-amino acid.

160. Which of the following is bounded by double membrane:
(a) Chloroplast (b) Mitochondria
(c) Nucleus (d) All the above
Uttarakhand-2005

Ans. (d) : Cell organelles bounded by double unit membrane – Mitochondria, chloroplast, Nucleus.

161. Study the following table:

List-I	List – II
A. Devoid of flagella	1. Single spherical bacterium
B. Rod shaped	2. Pneumonia causing bacteria
C. Bacteria in pairs	3. Anthrax causing bacteria
D. Comma shaped	4. Cholera causing bacteria
	5. Pleiomorphic bacteria

The correct match is.

	A	B	C	D
(a)	1	2	3	5
(b)	5	4	2	1
(c)	1	3	2	4
(d)	5	1	2	4

AP EAMCET-2004

Ans. (c) :
Devoid of flagella – Single spherical bacterium
Rod shaped – Anthrax causing bacteria
Bacteria in pairs – Pneumonia causing bacteria
Comma shaped – Cholera causing bacteria

162. Bacterial flagella is made up of:
(a) protein (b) amines
(c) lipids (d) carbohydrates
AFMC-2004

Ans. (a) Bacterial flagella is made up of protein. The primary protein building block of bacterial flagella is called flagellin.

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163. Which one of the following organisms may respire in the absence of oxygen?
(a) Azotobacter (b) Clostridium
(c) Rhizobium (d) Lactobacillus

CG PMT-2006

Ans. (b) : Clostridium is an example of an anaerobic bacterium i.e it can carry out its metabolic processes, including respiration, without the need for oxygen.

164. Barophilic prokaryotes
(a) grow slowly in highly alkaline frozen lakes at high altitudes
(b) occur in water containing high concentrations of barium hydroxide
(c) grow and multiply in very deep marine sediments
(d) readily grown divides in sea water enriched in any soluble salt of barium

CG PMT-2006

Ans. (c) : Barophilic prokaryotes also known as piezophilic or barotolerant prokaryotes, are micro-organisms that thrive and multiply in high- pressure environments, particularly in the deep ocean sediments where pressure is extremely high.

165. The telomeres of eukaryotic chromosomes consists of short sequences of
(a) thymine rich repeats
(b) cytosine rich repeats
(c) adenine rich repeats
(d) guanine rich repeats

Manipal-2007

Ans. (d) : The telomeres of eukaryotic chromosomes consist of short sequences of guanine rich repeats. These repeats are typically TTAGGG in vertebrates, including human. Telomere play a important role in protecting the ends of chromosomes from degradation and fusion, thus maintaining chromosomes stability during cell division.

166. The chief component of the middle lamella in plant cell is
(a) potassium (b) calcium
(c) magnesium (d) phosphorus

DUMET-2009
VMMC-2011
J&K CET-2004

Ans. (b) : The middle lamella is a thin, amorphous cementing layer that helps in the joining of two adjacent plant cells. The main component of the middle lamella is calcium pectate.

167. Extranuclear DNA (genes) are located in
(a) lysosomes and chloroplasts
(b) Golgi complex and ribosomes
(c) chloroplasts and mitochondria
(d) ribosomes and mitochondria

Haryana PMT-2010

Ans. (c) : Extranuclear inheritance or cytoplasmic inheritance is the transmission of genes that occur outside the nucleus. It is found in most eukaryotes and is commonly known to occur in cytoplasmic organelles such as mitochondria and chloroplast.

168. Genophore term was coined by Hans R is for
(a) genetic material of virus
(b) stack on which spore originated
(c) bacterial chromosome
(d) fungal chromosome

Haryana PMT-2008

Ans. (c) : The term "Genophore" was coined by Hans Ris to refer to the bacterial chromosomes it is the main genetic material in bacteria which contains the majority of their genes and is typically found as a single circular DNA molecule within the bacterial cell.

169. Which of the following is a prokaryote?
(a) Amoeba (b) Spirogyra
(c) Bacteria (d) Chlamydomonas

Haryana PMT-2008

Ans. (c) : Prokaryotic organism – bacteria
Eukaryotic — Amoeba, spirogyra, chlamydomonas

170. In which of the following endospores are formed?
(a) Mucor (b) Clostridium
(c) Saccharomyces (d) Rhizopus

Haryana PMT-2003

Ans. (b) : Endospores formation is more common in rod shaped bacteria or bacillus form. Clostridium is rod shaped bacteria hence endospores formed in clostridium.

171
(a) spirilla (b) vibrio
(c) cocci (d) bacilli

AP EAMCET-1997

Ans. (b) : Comma shaped bacteria are known as vibrio. It causes various systemic diseases such as cholera.

172. The most studied prokaryote is
(a) Klebsiella pneumonia
(b) Pseudomonas sp
(c) Escherichia coli
(d) Bacilus thuringiensis

CG PMT-2010

Ans. (c) : The most studied prokaryote is *Escherichia coli*, because of their comparative simplicity.
It is used a model organism due to its rapid growth ease of cultivation and well characterized genetics.

173. Merozygote is formed in
(a) Yeast (b) Spirogyra
(c) Escherichia coil (d) Neurospora

CG PMT-2010

Ans. (c) : Merozygote is formed in *E. coli.* During bacterial conjugation. It is a partial diploid cell resulting from the transfer of a plasmid carrying specific genes into a recipient bacterial cell.

174. In eukaryotic cells, the amount of basic proteins is often found to be
(a) more than the amount of DNA
(b) less than the amount of DNA
(c) equal to the amount of DNA
(d) none of the above

BHU PMT (Screening)-2011
AMU-2011, 1996

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Ans. (a) : In eukaryotic cells the amount of basic protein is often found to be equal to be more than the amount of DNA All the basic proteins (histones) are present in large quantity in any eukaryotic cell.

175. In which cell organelles a lipoprotein covering is absent in?

(a) Ribosomes (b) Lysosomes
(c) Mitochondria (d) Peroxisomes

BCECE-2008

Ans. (a) : Lipoprotein covering is absent in ribosomes.

176. Which cell organelle is present in both prokaryotic and eukaryotic cell?

(a) Ribosome (b) Mitochondria
(c) ER (d) Nucleus

BCECE-2004

Ans. (a) : Ribosome is present in both prokaryotic and Eukaryotic cell.

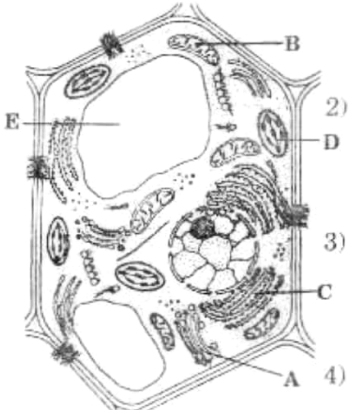
177. The secretion of macromolecules by fusing a transport vesicle to the plasma membrane is

(a) pinocytosis (b) phagocytosis
(c) endocytosis (d) exocytosis

Haryana PMT-2011

Ans. (d) : The secretion of macromolecules by fusing a transport vesicles to the plasma membrane is exocytosis.

178. The diagram of the ultrastructure of a plant cell is given below. Identify the functions of the organelles labelled A,B,C,D,E in the diagram.



(a) A = Principal director of macromolecular traffic, B = Site of oxidative phosphorylation, C = Intracellular transport, D = Site of Photophosphorylation, E = Storage of cell sap.

(b) A = Intracellular transport, B = Site of oxidative phosphorylation, C = Principal director of macromolecular traffic. D = Site of photo phosphorylation. E = Storage of cell sap.

(c) A = Storage of cell sap, B = Site of oxidative phosphorylation, C = Principal director of macromolecular traffic, D = Site of photophosphorylation, E = Intracellular transport .

(d) A = Site of photophosphorylation, B = Storage of cell sap, C = Intercellular transport, D = Site of oxidative phosphorylation, E = Principal director of macromolecular traffic.

Karnataka CET-2010

Ans. (a) : In germinating seeds, the process of breaking down fatty acids takes place exclusively in specialized organelles called glyoxysomes. Glyoxysomes are a type of peroxisomes that are specially involved in lipid metabolism.

179. In germinating seeds fatty acids are degraded exclusively in the:

(a) peroxisomes (b) mitochondria
(c) proplastids (d) glyoxysomes

AIPMT-2008

Ans. (d) : In germinating seeds, the process of breaking down fatty acids takes place exclusively in specialized organelles called glyoxysomes. Glyoxysomes are a type of peroxisomes that are specially involved in lipid metabolism.

180. Which one of the following organisms is not an example of eukaryotic cells ?

(a) Amoeba proteus
(b) Paramecium caudatum
(c) Escherichia coli
(d) Euglena viridis

AIPMT (Screening)-2011

Ans. (c) : • Eukaryotes have well defined nuclei which are enclosed in the nuclear envelope. Eukaryotic cells have membrane bound organ cells. Eukaryotic cells are much larger than Prokaryotic cells. Animals, Plants, fungi fall under eukaryotes. Example- *Amoeba proteus*, *Paramecium caudatum* and *Euglena viridis* etc.

• Prokaryotes are microscopic organism. They are single- celled organisms and lack defined nuclei. *Escherichia coli* is example of Prokaryotic cell.

181. Identify the true statement in the following.

(a) Each nucleosome consists of a core of five types of nine histone molecules
(b) Oxidation of fatty acids and synthesis of phospholipids occur in peroxisomes
(c) Telocentric chromosome contains two unequal arms
(d) Smaller sub-unit of ribosome contains the enzyme peptidyl transferase.

AP EAMCET-2010

Ans. (b) : Peroxisome is a small organelle that is bounded by a single membrane and found in plant and animal. They are the main site or fatty acid oxidation in plant cell and play a significant role in this regard in animal cell.

Each **Nucleosome** is composed of a little less than two turn of DNA wrapped around a set of eight proteins called **Histones**, which are known as **Histone Octamer**.

Telocentric chromosome centromere is located at the terminal end of the chromosome. The chromosome has only one arm.

The small ribosomal subunit programs protein synthesis. The large subunit contains the peptidyl transferase, site, the site at which peptide bonds are formed.

@apna_pdf

182. Some of the enzymes which are associated in converting fats into carbohydrates are present in:

(a) glyoxysomes (b) golgi bodies
(c) microsomes (d) liposomes

AP EAMCET-1997

Ans. (a) : Peroxisomes or glyoxysomes are found in all major groups of eukaryotic organism including yeasts fungi, protozoa, plants and animals plants and animals glyoxysomes are mircobodies with occurs only in fat rich plant cell, where they part in β-oxidation of fats and perform glyoxylate cycle. Glyoxysomes also possess catalase enzyme. Microsomes are artificial structures derived from pieces of endoplasmic reticulum formed during tissue homogenization liposomes are small artificial vesicles of spherical shape that can be created from cholesterol and natural non - toxic phospholipids.
Golgi body is membrane bound organelle found in eukaryotic cells.

183. Choose the wrong statement

(a) HIV virus has RNA as its genetic material
(b) HIV virus replicated in T_H lymphocytes
(c) Anti-retroviral drugs are only partially effective for AIDS treatment
(d) HIV spreads by sexual contact or sharing needle with the infected person and not by mere touch or physical contact
(e) The time-lag between the infection and appearance of AIDS symptom may vary from few hours to a week

Kerala PMT-2008

Ans. (e) : HIV infection symptoms vary depending upon the stage. After initial infection first few weeks, Patient may experience or can experience influenza like symptoms. But with the time HIV tend to be most infections in few months.

184. Match the following with correct combination

Column I	Column II
A. Endoplasmic reticulum	1. Stack of cisternae
B. Spherosome	2. Store oils or fats
C. Dictyosomes	3. Synthesis and storage of lipids
D. Peroxisome	4. Photorespiration
E. Elaioplasts	5. Detoxification of drugs

(a) A-5, B-3, C-1, D-4, E-2
(b) A-5, B-3, C-2, D-4, E-1
(c) A-2, B-3, C-1, D-4, E-5
(d) A-4, B-3, C-1, D-5, E-2
(e) A-3, B-5, C-1, D-4, E-2

Kerala PMT-2008

Ans. (a) : (A) Endoplasmic reticulum – perform detoxification in liver cells.
(B) Spherosome – take part in storage & synthesis of lipids.
(C) Dictyosomes – plate (stack) formation during cell division.
(D) Peroxisomes – Takes part in photorespiration
(E) Elioplast – Specialized in oil synthesis and storage.

185. Which one of the following is absent from the plant cell?

(a) Cell wall (b) Dictyosomes
(c) Centrioles (d) Plastids

J&K CET-2002

Ans. (c) : Centrioles are Paired barrel-shaped organelles located in the cytoplasm of animal cells near the nuclear envelope. Centrosome located near the nucleus in the animal cell and some lower plant cells but in higher plant, it is absent. It is involved in the formation of spindle fiber during cell division.
Dictyosomes are also called as Golgi apparatus or Golgi body organelles, plastid are the main sites of photosynthesis in eukaryotic cells.

186. Animal cell differs form plant cells in not having the:

(a) Cell wall (b) plastids
(c) glyoxysomes (d) all of these

J&K CET-2002

Ans. (d) : Animal cell differ from plant cell in possessing a centrosome that participates in the formation of spindle apparatus during ell division.
Plant cell have plastids but animal cell do not have Plastids centrosomes are absent in plant cells, animal cell have centrosome, Glyoxysomes are micro bodies which occur only in fat rich plant cell.

187. Which one of the following are absent in animal cells?

(a) Cell wall and plastids
(b) Nucleus and centrosome
(c) Mitochondria and Golgi bodies
(d) Chromosome and ribosome

Assam CEE-2014

Ans. (a) : Cell wall and chloroplast or plastid are not present in the animal ell. The cell wall in a plant cell is a very tough. Flexible and sometimes fairly rigid layer that surrounds some type of cells. It surrounds the cell membrane and provides these cells with structural support and protection. Plastids are the main sites of photosynthesis in eukaryotic Plant cells.

188. Choose the wrong statement regarding AIDS

(a) AIDS is an immunodeficiency disease
(b) It is caused by a retrovirus, HIV
(c) HIV selectively infects and kills B-lymphocytes
(d) Retroviruses have RNA genomes that replicate via DNA intermediate
(e) Viral RNA genome is converted into DNA copy by reverse transcriptase

Kerala PMT-2009

Ans. (c) : A retro virus is a type of RNA virus that inserts a copy of its genome into the DNA of a host cell that in invades, thus changing the genome of the cell HIV is an enveloped retrovirus. Each virus particles contains two copies of an RNA genome.
RNA virus such as HIV have RNA genomes, which can also be either double stranded or single stranded. Their genomes can be either RNA or DNA.
Retroviruses are ssRNA viruses that replicate through a DNA.

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189. The reactions of pentose phosphate pathway (PPP) take place in
(a) Mitochondrion
(b) Cytoplasm
(c) Chloroplast, Peroxisome and Mitochondrion
(d) Chloroplast, Glyoxysome and Mitochondrion
(e) Chloroplast, Lysosome and Mitochondrion

Kerala PMT-2009

Ans. (b) : PPP also called known by HMP (Hexose monophosphate pathway) act as precursor to nucleoside synthesis. The pentose phosphate pathway is a metabolic pathway which is carried out in most of the organism. This pathway occurs parallel to glycolysis. This pathway produces pentose's from Glucose 6-phosphate. The pathway takes place in the cytoplasm is most of pathway takes place in the cytoplasm is most of the organism. In the case of plants, there are certain reactions. Which occurs in the plastids.

190. Consider the following statement: (1) In plant cells, cytokinesis start with the formation of the phragmoplast (2) phragmoplast comprises interzonal macrotubules and Golgi vesicles (3) Primary cell wall is produced by microtubules (4) Phragmoplast is formed by nucleus
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 1, 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2006

Ans. (a) : The phragmoplast is a plant cell specific structure that form during late cytokinesis. This complex assembly of microtubules actin filaments and associated molecules acts as a framework for cell plate assembly and subsequent formation of the future cell wall separating the two daughter cells cellular component.
The phragmoplast (form from golgi body) initially contains the congruent orientation of the cortical array of microtubules which lies just inside the plasma membranes and cellulose micro fibrils lying just outside. In the progressive stages phragmoplast forms barrel shaped organ with microtubules golgi apparatus, ribosome and endoplasmic reticulum. The primary cell wall is assembled by the deposition of polymers, hemicelluloses pectin.

191. Double membrane structure of cell are:
(a) Nucleus (b) chloroplast
(c) mitochondria (d) all of these

AIIMS-2000

Ans. (d) : Nucleus is a spherical cellular component that is surrounded by a nuclear double membrane nucleus is a cellular comportment of the cell containing the genetic material.
The chloroplast is the plant organelle that consist of flattened discoid sacs called thylakoids this organelle consumes carbon dioxide and liberates oxygen. Mitochondria shows catabolism which is defined to be the set of reactions that allows the breakdown of large molecules along with the release of energy.

192. Which of the following enhances or induces fusion of protoplasts?
(a) Polyethylene glycol and sodium nitrate
(b) IAA and kinetin
(c) IAA and gibberellins
(d) Sodium chloride and potassium chloride

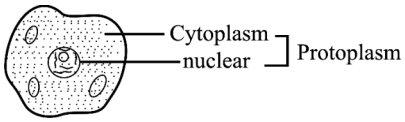
AIPMT-2015

Ans. (a) : Polyethylene glycol (PEG) and sodium nitrate enhances fusion of protoplasts (protoplast fusion), protoplast fusion is physical phenomenon which occurs due to the fusion of protoplast (cell without cell wall) of two more cell.
Polyethylene Glycol and sodium nitrate are most-commonly used protoplast fusion inducing agents which are commonly known as **chemical fucogens**.

193. A protoplast is a cell
(a) Without cell wall
(b) Without plasma membrane
(c) Without nucleus
(d) Undergoing division

AIPMT (Re-Exam)-2015

Ans. (a) : A protoplast in a cell without cell wall. It is a plant, bacterial or fungal cell that had its cell wall removed, either completely or partially via mechanical, chemical or enzymatic actions.
The colour less material comprising the living part of a cell, including the cytoplasm nucleus and other organelles.



194. Match the following and select the correct answer:

A.	**Centriole**	**(i)**	**Infoldings in mitochondria**
B.	**Chlorophyll**	**(ii)**	**Thylakoids**
C.	**Cristae**	**(iii)**	**Nucleic acids**
D.	**Ribozymes**	**(iv)**	**Basal body cilia or flagella**

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iv)	(ii)	(i)	(iii)
(b)	(i)	(ii)	(iv)	(iii)
(c)	(i)	(iii)	(ii)	(iv)
(d)	(iv)	(iii)	(i)	(ii)

AIPMT-2014

Ans. (a) : Basal bodies of eukaryotes are modified centrioles that give rise to cilia and flagella. Have Mg^{++} as central element.
Chlorophyll is found in high concentrations in chloroplasts of plant cells. They are vital for photosynthesis and are specifically arranged in and around photo systems that are embedded in the thylakoid membranes of chloroplasts. The inner membrane of the mitochondrion fold inwards, forming the cristae. The cristae increase the surface area to increase the productivity of cellular respiration.
Ribosome's, also termed RNA molecules are capable of catalyzing specific biochemical reactions are ribonucleic acid that are self splicing.

@apna_pdf

195. A human RBC is placed in 1.5% salt solution. It will :-

(a) Swell up (b) Shrink
(c) Remain unaffected (d) Burst.

AIIMS-2001

Ans. (b) : Human RBC isotonic for 0.9% salt solution water moves from high conc. to low concentration human RBC = 1.5 % salt solution

↓ ↓
Hypotonic Hypertonic

$H_2O\uparrow$ $H_2O\downarrow$

RBCs is an animal cell when a animal cell is placed in 1.5% NaCl the cell shrinks, because, when a cell is placed in high salt concentration exosmosis will occur and the cell will lose water, water moves from higher water concentration to lower water concentration.

196. In plant cells peroxisomes are associated with:

(a) Photorespiration (b) Phototropism
(c) Photoperiodism (d) Photosynthesis

AIPMT-1993

Ans. (a) : Peroxisomes or microbodies are small organelle which contains reducing and oxidizing enzyme catalase, it helps in breakdown of long chain fatty acids through β-oxidation.

Peroxysome produces two plant hormone which are associated with chloroplast and mitochondria and help in photorespiration. Peroxisomes were one of the last major cellular organelles to be discovered. In plant cells peroxisomes are associated with photorespiration.

197. HIV virus affect …… in AIDS patient.

(a) cytotoxic T-cell (b) M-N cell
(c) suppressor cell (d) helper T-cells

Punjab MET-2008

Ans. (d) : HIV finds the white blood cells called CD_4 cells. HIV finds to the CD_4 molecule on the surface of helper T-cells and replicates within them. This results in destruction of CD_4+T – cells and leads to a steady decline in this population of T-cells. The definition of Progressive and slow loss of CD_4+T cells is not clear.

T-cells → Also called T- lymphocytes are major components of the adaptive immune system. Their role include – directly killing infected host cells, Activating other immune cells Producing cytokines and regulating the immune response.

T-cells mainly 2 types–

Cytotoxic T-cells

Helper-T-cells

198. Eukaryotic cell has

(a) chromatin fibre (b) definite nucleus
(c) incipient nucleus (d) None of these

CG PMT-2005

Ans. (b) : The nucleus generally is the double membrane bound organelle found in eukaryotes, which encloses the cell's genetic material. Example plants, animal, fungi cell. Prokaryotes lack a nucleus they have a specialize irregular undefined region in their cytoplasm in which the genetic material floats. This region is called the incipient nucleus.

199. A mature plant cell has

(a) cell wall (b) vacuole
(c) protoplasm (d) All of these

CG PMT-2005

Ans. (d) : The Protoplasm can be defined as a material which comprises of the living part of the cell including the cytoplasm, nucleus and other organelles. Plant cells are characterized by the presence of large vacuoles and cell wall, which are not seen in animal cells.

• Cell wall constructed outside the cell membrane and composed of cellulose and hemicelluloses to pectin. Vacuole outer membrane called tonoplast that maintain water balance.

Protoplasm – responsible for all living processes.

Cytoplasm + nucleus = Protoplasm

Plant cell – cell wall = Protoplasm

200. Which of the following gland is often referred in relation with AIDS?

(a) Thyroid (b) Thymus
(c) Adrenal (d) Pancreas

WB JEE-2007

Ans. (b) : The thymus is a primary lymphoid organ where T cells or T-lymphocytes mature. T cells are critical to the adaptive immune system, where the body adapts specifically to foreign invaders. The HIV virus causes an acquired T-Cell immunodeficiency syndrome (AIDS) by sporadically killing CD_4 + T-cells. Where as the major effect of the virus is on mature peripheral T-cells, HIV can also infect developing thymocytes in the thymus most of which express CD_4.

• Thymus gland is an endocrine gland present in chest between the lung and behind the breast bone/sternum. Thymus and bone marrow creates special immune system cells called lymphocytes. Lymphocytes are 2 type – T-Lymphocyte, B-Lymphocyte.

201. The cell organelles are found in

(a) Bacterial cells
(b) Cyanobacterial cells
(c) Prokaryotic cells
(d) Eukaryotic cells

WB JEE-2007

Ans. (d) : Eukaryotic cells are defined as cells containing organized nucleus and organelles which are enveloped by membrane bound organelles. Eukaryotic cells have a 'Eu' or advanced nucleus (include plant animal fungi protistan) having a well developed nuclear membrane, nucleolus and histone proteins for packaging of chromatin material. Eukaryotic cell also possesses several membrane bound organelles like plastids and mitochondria, nucleus, endoplasmic reticulum, golgi body.

202. A feature of peroxisome in our body is

(a) they are associated with synthesis and storage of lipids
(b) they contain oxidising enzymes and promotes gluconeogenesis
(c) they contain oxygenase a detoxification enzyme
(d) They are not found in intact cells

MGIMS Wardha-2015

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Ans. (b) : The peroxisome is a single membrane bound organelles which contains oxidative enzymes and is responsible for lipid production and oxidation reactions within the cell.

The important oxidation reactions of peroxisome within a cell are oxidation or breakdown of excess purines ie, adenosines monophosphate to uric acid. It contains the enzyme called D- amino acid oxidase which oxidises amino acids. It also oxidase or metabolises alcohol and drugs in the liver by paroxysmal catalase.

203. Which of the following test is used for AIDS ?

(a) ELISA test (b) Western blot test
(c) P.C.R. (d) None of these

Rajasthan PMT-1999

Ans. (a) : ELISA Stands for enzyme linked immunoassay. It is commonly used laboratory test to detect antibodies in the blood. An antibody is a protein produced by the body's immune system when it detects harmful substances called antigens.

• Western blot is often used in research to separate and identify proteins. In this technique a mixture of proteins is separated based on molecular weight and thus by type through gel electrophoresis.

• PCR (Polymerase chain reaction) used to rapid make several copies of specific DNA sample to diagnose certain infectious disease and genetic changes.

204. Which of the following statement is not true?

(a) Animal cells never contain chloroplast unlike many plant cells
(b) Animal cells contain ultrascopic chloroplast while plant cells contain microscopic chloroplast
(c) Plant cells have cellulosic cell wall while animal cells do not
(d) Plant cells have central vacuoles while animal cells do not

BVP-2008

Ans. (b) : Animal cells do not have chloroplast the process of photosynthesis, where chloroplasts convert photochemical energy into sugar is exclusive to plant cells. Plants play important role as the basis of all life on Earth, as they produce the essential oxygen and serves as a primary source of food for many organisms.

205. Tonofibrils of desmosomes are made up of :

(a) chitin and keratin (b) keratin and actin
(c) actin and desmin (d) keratin and desmin

BVP-2006

Ans. (d) : Tonofibrils are made up of keratinous intermediate filaments called tonofilaments.

These are components of cytoskeleton of cell. Desmosomes fibrils made up of keratin intermediate filaments and other protein.

Desmosomes in the plasma membrane and help in cell adhesion. They are found in the cells of most invertebrates and vertebrates.

206. A mature plant cell has

(a) cell wall and protoplasm
(b) protoplasm and vacuole
(c) vacuole and cell wall
(d) Both [b] and [c]

CG PMT-2004

Ans. (d) : In addition to number of organelles, a mature plant cell also contains a cell wall, a large central vacuole and plastide. In most mature plant cells the central vacuole occupies a large proportion (upto 90%) of the total cell volume. Cell wall-provides structure and support. Protoplasm contains all the metabolic machinery of cell. The vacuole helps maintain the shape and size of the cell.

207. In prokaryotes, chromatophores are

(a) specialised granules responsible for colouration of cells
(b) structures responsible for organising the shape of the organism
(c) inclusion bodies lying free inside the cells for carrying out various metabolic activities
(d) internal membrane systems that may become extensive and complex in photosynthetic bacteria

JIPMER-2011

Ans. (d) : Prokaryotes like some photosynthetic bacteria contain coloured vesicles which are associated with the membrane. These are known as chromatophores. The word chroma means colour. It is structurally and functionally similar to the chloroplast found in eukaryotes. Prokaryotes such as – Cyanobacteria and rhodospirillum. 2 main pigments → carotenoids and bacteriochlorophyll.

208. Bacterium have flagella with all over body is known as

(a) peritrichous (b) amphitrichous
(c) monotrichous (d) none of these

VMMC-2004

Ans. (a) : In the condition of peritrichous bacteria, they have flagella distributed all over their body surface. This arrangement enables them to move in any direction, giving them a 360° range of motion.

209. Which is correct for the structure of cell wall of bacteria and fungi?

(a) Both are made up of cellulose
(b) Both have mucopeptide
(c) Both are made up of N-acetylglucosamine
(d) None of these

VMMC-2004

Ans. (c) : The cell wall of fungus is made up of fungal cellulose of chitin and cell wall of bacteria is made up of peptidoglycans. Fungal celluloses or chitin microfibrils are made up of bundles of unbranched chains of β-1 4 acetyl glucosamine residues.

Peptidoglycans are the structural elements of almost all the bacterial cell walls peptidoglycans are made up of a polysaccharide backbone consisting of alternation muramic acid acetylated glucosamine residues in equal amount.

210. The desmosomes are concerned with :

(a) cytolysis (b) cellular excretion
(c) cell division (d) cell adherence

Haryana PMT-2000

Ans. (d) : A desmosome is a cell structure specialized for cell to cell adhesion, also referred to as a macula adherens. They are localized spot–like adhesions

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randomly clustered on the lateral sides of plasma membrane a form of junctional complex Desmosomes are one of junctional complex or one of the stronger forms of cell to cell adhesion. These found in tissues, such as cardiac muscle tissue, bladder tissue gastrointestinal mucosa and epithelia.

211. A bacterium divides after every 35 minutes. If a culture containing 10^5 cells per mL is grown, then cell concentration per mL after 175 minutes will be:

(a) 175×10^5 (b) 125×10^5
(c) 48×10^5 (d) 32×10^5

Manipal-2008

Ans. (d) : Total time = 175 min
1 division = 35 min

$$\text{Total division} = \frac{175}{35} = 5$$

1 bacterial cells divides into 2 cell concentration/ml
$= 2^5 \times 10^5 = 32 \times 10^5$ cells/ml

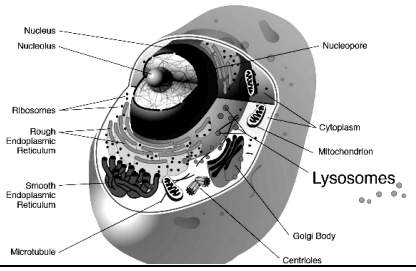
G. Cell Organelles to Understand its Structure and Functions

212. Lysosome contains:

(a) Oxidative enzymes
(b) Hydrolytic enzymes
(c) Reductive enzymes
(d) Anabolic enzymes

MGIMS Wardha-2012
AIPMT-2000
Haryana PMT-2000
AFMC-2007

Ans. (b) : A lysosome is a tiny sac bounded by a single unit membrane of lipoprotein. It contains a dense, finely granular fluid. It consists of glycoprotein hydrolytic (digestive) enzymes called acid hydrolases. These include proteases, lipases, nucleases, glycosidases, sulphatases, acid phosphatases, etc. Lysosomes also digest or damage its own cells by its own enzymes, which lead to cell death. This process is called as autolysis. Hence lysosomes are also called as suicide bags.



213. Study the following table

I.	Interphase nucleus	Synthesis phase	Metabolically active
II.	Nucleosome	Two coils	Histone
III.	Contractile vacuole	Excretion	Single membrance
IV.	Lysosomes	Cistrans faces	Autolysis

Identify correct pair.

(a) III, IV (b) II, IV
(c) I, II (d) I, III

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : • Previously interphase was called resting stage because there is no visible activity related to cell division in this stage. Later studies proved that the interphase of a cell is metabolically quite active.
• Histones are a family of basic protein that assocaites with DNA to form chromatin. There are two types of histones proteins. Core histones and linker histones.

214. Select the correct matching

List - I		List - II		List - III
A	Endoplasmic reticulum	P	Singer + Nicolson	W	Secretion
B	Ribosomes	Q	Palade	X	Protein synthesis
C	Cell membrane	R	Porter	Y	Fluid mosaic model

(a) A-R-W B-Q-X C-P-Y
(b) A-R-W B-P-Y C-Q-X
(c) A-P-W B-Q-X C-R-Y
(d) A-P-W B-R-X C-Q-Y

TS EAMCET 10.05.2023 Shift-I

Ans. (a) :
(A) Endoplasmic reticulum → Porter → Secretion
(B) Ribosomes → Palade → Protein synthesis
(C) Cell membrane → Singer + Nicolson → Fluid mosaic model

215. The smooth and rough endoplasmic reticulum are involved in the synthesis of

(a) Lipids and proteins and secretion
(b) Steroidal hormones and Lipids
(c) Fats and steroidal hormones
(d) Carbohydrates and proteins

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : The smooth and rough endoplasmic reticulum are involved in the synthesis of lipids and proteins and secretion.

216. Name the cell organelle which are involved in the following processes
(A) Conversion of stored lipids to carbohydrates
(B) Catabolism of long chain fatty acids

(a) Lysosome, Peroxysome
(b) Dictyosome, Ribosome
(c) Peroxisome Micro bodies
(d) Glyoxysome, Peroxysome

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : Glyoxysome– Glyoxysome also possess catalase enzyme. In fat storing plant cells, first fats are converted to carbohydrates which are then metabolised.
Peroxysome– A major function of the peroxisome is the breakdown of very long chain fatty acids through beta-oxidation.

217. Assertion (A) : Syncytium is the result of karyokinesis not followed by cytokinesis
Reason (R) : In plant cells, middle lamella formation starts from centre and grows outwards of the cell and leads to wall formation
The correct option among the following is

@apna_pdf

(a) (A) and (R) are true. (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-11.05.2023, Shift-I

Ans. (b) : In some organisms, karyokinesis is not followed by cytokinesis as a result of which, multinucleate condition arises leading to the formation of syncytium.

• Located between the double cell wall of the neighboring cells, the middle lamella is the first layer of the wall to develops. As it is the outer layer out of the three layers of the cell wall, the middle lamella serves as the portion that connects the neighboring cells.

218. Identify Amembraneous cell organelles

(a) Ribosome, Nucleolus
(b) Nucleolus, Lysosome
(c) Peroxisome, Nucleolus
(d) Ribosome, lysosome

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : Ribosome– Ribosomes are the most important cell organelle which is composed of proteins and also composed of RNA. It is not covered by any membrane.

Nucleolus– Non-membranous organelle is both nucleolus and the centriole.

219. Which of the following statements are correct with respect to Golgi apparatus?

(A) It is the important site of formation of glycoprotein and glycolipids.
(B) It produces cellular energy in the form of
(C) It modifies the protein synthesized by ribosomes on ER.
(D) It facilitates the transport of ions.
(E) It provides mechanical support.
Choose the most appropriate answer from the options given below :

(a) (A) and (D) only (b) (D) and (E) only
(c) (B) and (C) only (d) (A) and (C) only

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : Golgi apparatus is the important site of formation glycoproteins and glycolipids. It modifies the protein synthesized by ribosomes present on endoplasmic reticulum.

■ Mitochondria produce ATP and cell membranes facilitate the transport of ions.
■ Cytoskeleton provides the mechanical support to the cell.

220. Which of the following functions is carried out by cytoskeleton in a cell?

(a) Transportation
(b) Nuclear Division
(c) Protein synthesis
(d) Motility

NEET (UG) 07.05.2023

Ans. (d) : The cytoskeleton is a structure that helps cells maintain their shape and internal organization and it also provides mechanical support that enables cells to carry out essential functions like division and movement.

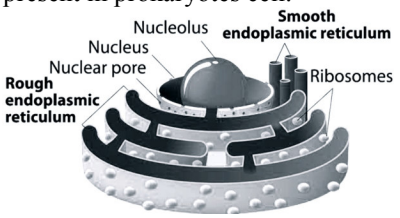
221. Which of the following statements with respect to Endoplasmic Reticulum is incorrect?

(a) SER are the sites for lipid synthesis
(b) RER has ribosomes attached to ER
(c) SER is devoid of ribosomes
(d) In prokaryotes only RER are present

NEET-2022

Ans. (d) : "Endoplasmic Reticulum is a complex network of tubular membranes exclusively present in the cytoplasm of the eukaryotic cell"

• It is not present in prokaryotes cell.



222. What happens if golgi apparatus of a cell is misfunctioning?

(a) Cell wall synthesis takes place
(b) No cell plate formation
(c) Two cells are completely formed during mitosis from a single cell
(d) There is no effect on the cytokinesis

TS EAMCET-31.07.2022 Shift-II

Ans. (b) : Golgi apparatus is present in all eukaryotic cell except RBC and sieve tube elements. In plant cells the unit of golgi apparatus is called as dictyosome while in animal cell it occurs as single compact or loose complex. Golgi vesicles play an important role in cell plate formation during cytokinesis of plant cell. Cell plate formation depend on phrangmoplast vesicles.

223. In which organelle the enzyme catalase is found?

(a) Lysosome (b) Peroxisome
(c) Oxysome (d) Quantasome

Tripura JEE-2021

Ans. (b) : Peroxisome are found in all eukaryotic cells. They contain oxidative enzymes, such as catalase and urate oxidases, at such high concentration that in some cells the peroxisomes stand out in electron micrographs because of the presence of a crystalloid core.

224. Which is the important site of formation of glycoproteins and glycolipids in eukaryotic cells?

(a) Peroxisomes (b) Golgi bodies
(c) Polysomes (d) Endoplasmic reticulum

NEET-2020 Phase-I

Ans. (b) : The golgi apparatus is the important site of formation of glycoproteins and glycolipids in eukaryotic cells.

225. Match the following columns and select the correct option :

	Column – I		**Column–II**
A.	**Smooth endoplasmic Reticulum**	**i.**	**Protein synthesis**
B.	**Rough endoplasmic Reticulum**	**ii.**	**Lipid synthesis**
C.	**Golgi complex**	**iii.**	**Glycosylation**
D.	**Centriole**	**iv.**	**Spindle formation**

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(a) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(b) (A)-(ii), (B)-(i), (C)-(iii), (D)-(iv)
(c) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)
(d) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)

NEET-2020 Phase-II

Ans. (b) :

(A)	Smooth endoplasmic reticulum	(ii)	Lipid synthesis
(B)	Rough endoplasmic reticulum	(i)	Protein synthesis
(C)	Golgi complex	(iii)	Glycosylation
(D)	Centriole	(iv)	Spindle formation

226. Which among the following is not true for Endoplasmic Reticulum?
(a) ATP synthesis (b) Protein Synthesis
(c) Lipid Synthesis (d) Secretion

AP EAMCET-24.09.2020 Shift-I

Ans. (a) : Endoplasmic reticulum is the membranous cellular organelle which is responsible for synthesis and transportation of proteins and enzymes in different parts of the cell. ATP synthesis is the enzyme that makes ATP molecules.

227. Cilium and Flagellum emerge from centriole like structures called
(a) Plasma membrane (b) Basal bodies
(c) Radial bodies (d) Axoneme

AP EAMCET-24.09.2020 Shift-I

Ans. (b) : The centrioles form basal body of cilia & flagella it leads to forming spindle fibres during mitosis. The cilium and flagellum arise from the basal body. The basal body is a protein structure found at the base of a cilium flagellum.

228. Which of the following cell organelles is present in the highest number in secretary cells?
(a) Lysosome
(b) Mitochondria
(c) Golgi complex
(d) Endoplasmic reticulum

NEET (Odisha)-2019

Ans. (c) : The Golgi complex is most abundantly in the secretary cell as the Golgi apparatus is responsible for the packaging is and transport of secretary cell has the largest Golgi apparatus. All glandular cell depend upon Golgi complex for concentrating and pouring their secretion to outside.

229. Match the column I with column II.

Column-I		Column-II	
(A)	**Golgi apparatus**	**(i)**	**Synthesis of protein**
(B)	**Lysosomes**	**(ii)**	**Trap waste and excretory products**
(C)	**Vacuoles**	**(iii)**	**Formation of glycoproteins and glycolipids**
(D)	**Ribosomes**	**(iv)**	**Digesting biomolecules**

Choose the right match from options given below:
(a) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
(b) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(c) (A)-(iv), (B)-(iii), (C)-(i), (D)-(ii)
(d) (A)-(iii), (B)-(ii), (C)-(iv), (D)-(i)

NEET (Odisha)-2019

Ans. (b) : Golgi apparatus – Formation of glycoproteins and glycolipids.
The proteins and lipids are glycosylated by the activity of glycosyltransferase and the glycans are attached to them.
- **Lysosomes** – Digesting biomolecules
  It contains a hydrolytic enzyme that digests the waste and other bad organelles. When the cell dies, the lysosomes digest the dead cell.
- **Vacuoles** – Trap waste and excretory products
  Vacuoles contains water, sap and excretory products. In plant cells, Vacuole is the part of endomembrane system.
- **Ribosomes** – Synthesis of protein, the ribosome is the structure within living cells that manufactures proteins. It attaches to a strand of messenger RNA.

230. Observe the following functions of the cell.
- **Synthesis of protein and enzymes**
- **Synthesis of lipids**
- **Synthesis on Glycolipids**
- **Enzymes optimally active in acidic pH.**

Arrange the given cell organelles with their respective functions,
(A) Golgi apparatus
(B) Rough endoplasmic reticulum
(C) Smooth Endoplasmic reticulum
(D) Lysosome
(E) Ribosome
(F)Mitochondria
Options:
(a) B, A, C, E (b) E, A, C, D
(c) B, C, E, F (d) E, C, A, D

AP EAMCET-24.04.2019 Shift-II

Ans. (d) : Ribosome : Synthesis of protein and enzymes. **Smooth endoplasmicreticulum** – synthesis of lipid
Golgi apparatus : Synthesis of Glyolipids.
Lysosome : Enzymes optimally active in acidic PH.

231. Which of the following is not correctly paired ?
(a) Mitochondria – Cristae
(b) Lysosome – Microtubule
(c) Mitochondria – Cellular respiration
(d) Ribosome – Protein synthesis

Tripura JEE-2019

Ans. (b) :
Mitochondria — Cristae
Lysosome — Hydrolytic enzyme
Mitochondria — Cellular respiration
Ribosome — Protein synthesis

232. The Golgi complex participates in
(a) Fatty acid breakdown
(b) Formation of secretory vesicles
(c) Activation of amino acid
(d) Respiration in bacteria

NEET-2018

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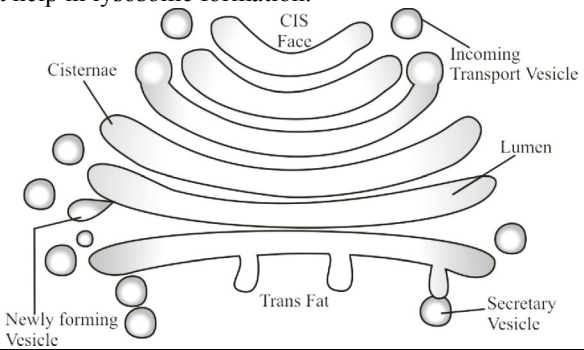
Ans. (b) : Formation secretary vesicle and secretion is the principal function of Golgi complex.
Golgi complex is organelle found in Eukaryotic cell.
It is a multiple compartment organelle with a double outer membrane.
It packages packets of proteins into the vesicle.
Other functions of Golgi complex is
It is a dispatch station for protein.
It identifies and labels the materials which are further distributed in the cells.
It is also a part of lipid transport.
It help in lysosome formation.



233. Study the following statements.
(A) Ribosomes and Nucleolus are not membrane bound structures.
(B) Tonoplast facilitates transport of ions against concentration gradient into the vacuole.
(C) Peroxysomes are membrane bound structures and play role in the synthesis of phospholipids.
(D) Lipids are converted into carbohydrates by Glyoxysomes.
From the above true statements are:
Options:
(a) A,B,C,D (b) B,C,D
(c) C,D (d) D only
AP EAMCET-28.04.2017 Shift-II

Ans. (a) Due to membraneless organelle ribosome free float in cytoplasm and nucleolus found in nucleus in all eukaryotic cell.
Tonoplast- Outer membrane of vacuole act as semi permeable membrane thus it maintain the balance of ions inside and outside of central vacuole.
Peroxysome- Glyoxylate cycle occurs in it which is a variant of citric acid cycle.
Glyoxysome- Plays role in germinating seed take part in β oxidation of fat in glyoxylate, found in plants and few filamentous fungi.

234. The organelles which occur external to cell membrane but internal to cell wall are:
(a) Peroxisomes (b) glyoxysomes
(c) sphaerosomes (d) lomasomes
VMMC-2006

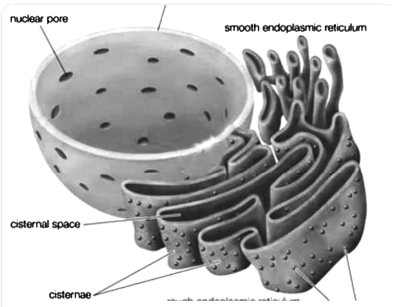
Ans. (d) : Lomasomes are vesicular and membranous structures usually present between cell wall and plasmalemma of plant cells their definite function is not known but probably they help in cell wall elaboration.

235. The term protoplasm was coined by:
(a) Virchov (b) Purkinje
(c) DuJardin (d) Kolliker
Manipal-2000

Ans. (b) : The term protoplasm was coined by parkinje. F Dujardin gave the term sarcode for protoplasm

236. A major site for synthesis of lipids is :
(a) Nucleoplasm (b) RER
(c) SER (d) Symplast
NEET-2013

Ans. (c) :



endoplasmic reticulum

Endoplasmic reticulum is the organelle which forms a interconnected network of the flattened sacs which are commonly known as cisternae. This is classified into two type-like rough endoplasmic reticulum and smooth endoplasmic reticulum. The cytoplasm's inner core is known as endoplasm.
- The smooth endoplasmic reticulum is the major site for the synthesis of the lipids and also it lacks the ribosome whereas the rough endoplasmic reticulum is decorated with ribosome and these are the site of protein synthesis.
- In smooth endoplasmic reticulum the lipid like hormones are synthesized. So it is clear that smooth endoplasmic reticulum is the major site in synthesis of lipid.

237. Mitochondria and chloroplasts are similar because
(a) both have 80S ribosomes
(b) both have nuclei
(c) both have single membrane envelope
(d) both have DNA
MGIMS Wardha-2013

Ans. (d) : Mitochondria and chloroplasts are similar because both have DNA which can function independently of the eukaryotic host cell.

238. A function of lysosomes is
(a) replication (b) hydrolysis
(c) respiration (d) None of the above
MGIMS Wardha-2013

Ans. (d) : Lysosome function as the digestive system of the cell, serving both to degrade material taken up from outside the cell and to digest absolute component of the cell itself.

239. DNA remains absent in :
(a) chloroplast (b) nucleus
(c) peroxisomes (d) chromosome
MGIMS Wardha-2003

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Ans. (c) : Peroxisomes do not have DNA. DNA is present in nucleus and some cell organelles like chloroplast and mitochondria
Peroxisomes were discovered by Tolbert.

240. Which of the following is an epidermal cell containing chloroplast?
(a) Stomata (b) Hydathode
(c) Guard cell (d) None of these
JIPMER-2013

Ans. (c) : Guard cell are the specialized epidermis cells containing chloroplast and also regulate the opening and closing of stomata.

241. Which of the following organelles does not contain RNA?
(a) Plasmalemma (b) Ribosome
(c) Chromosome (d) Nucleolus
HP CET - 2012
JIPMER - 2013

Ans. (a) : The plasmalemma also known as the cell membrane is responsible for regulating the movement of substances in and out of the cell. It primarily consists of lipids and proteins and does not contain RNA.

242. In addition to absence of chlorophyll what is the other difference between fungi and higher plants?
(a) Type of nutrition and composition of cell wall
(b) Cell type
(c) Nucleus
(d) Reproduction
Haryana PMT-2006

Ans. (a) : Fungi lack chlorophyll, therefore heterotrophic in nature. Their cell wall formed of chitin (fungus cellulose). Type of nutrition and composition of cell wall is the difference between fungi and higher plants.

243. Lysosomes are not found in
(a) Leukocytes (b) Amoeba
(c) Hela cells (d) Mammalian erythrocytes
CG PMT-2010

Ans. (d) : Lysosomes are not found in mammalian erythrocytes.

244. Membrane is absent in
(a) Nucleus (b) Nucleolus
(c) Vacuole (d) Lysosome
Rajasthan PMT-2011

Ans. (b) : Nucleolus is not a membrane bound structure. It is a site for active ribosomal RNA synthesis.

245. Which one of the following percentage of inorganic salt in the protoplasm ?
(a) 5-7% (b) 2-3%
(c) 0.1-2.5% (d) 50-60 %
Rajasthan PMT-2000

Ans. (b) :2.3% of inorganic salt in protoplasm.

246. An antiviral substance known to prevent the synthesis of new virus in the cell is known as
(a) transferon (b) antibody
(c) inferon (d) interferon
AMU-1996
HP CET-2012
Punjab MET-2006

Ans. (d) : Interferon's are proteins that are part of your natural defenses. Interferon's are made in the body by white blood cells and other cells. An antiviral substance known to prevent the synthesis of new virus in the cell is known as interferon.

247
(a) Lysosome (b) Mitochondria
(c) Golgi body (d) Nucleolus
HP CET-2012

Ans. (a) : Non Autonomous cell organelles bounded by single unit membrane Lysosome, spherosomes.

248. The membrane less cell organelle is:
(a) Golgi body (b) Chloroplast
(c) Endoplasmic reticulum (d) Ribosome
Rajasthan PMT-2000

Ans. (d) : The membrane less cell organelle is Ribosome The double membrane bound organelles is Golgi body, Chloroplast, Endoplasmic Reticulum

249. Cell organelle are present in:
(a) nucleoplasm (b) cytoplasm
(c) hyluplasm (d) none of these
Rajasthan PMT-2000

Ans. (b) : Cell organelle are present in cytoplasm. Cytoplasm is the gel like substance present between the cell membrane and the nucleus. Various other components or organelles of cell are present in the cytoplasm.

250. Most of the hydrolytic enzymes of lysosomes function at
(a) acidic pH (b) basic pH
(c) neutral pH (d) any pH
CMC Ludhiana-2011
CG PMT-2009

Ans. (a) : Lysosomes are membrane bound vesicular structure formed by the process of packaging in the golgi apparatus. The isolated lysosomal vesicles, have been found to be very rich in almost all type of hydrolytic enzymes optimally active at the acidic pH.

251. Tonoplast is a membrane, which is found surrounding the
(a) vacuole (b) cytoplasm
(c) nucleus (d) None of the above
AMU-2009, 2001

Ans. (a) : The vacuole is the membrane-bound space found in the cytoplasm. It contains water, sap excretory product and other materials not useful for the cell. The vacuole is bound by single membrane called tonoplast. In plant cell vacuoles can occupy up to 90% of the volume of cell.

252. Identify the tumor suppressor genes form the following.
(a) Oncogenes (b) P^{53} genes
(c) Pseudogenes (d) SRY genes
AP EAMCET-2013

Ans. (b) : P^{53}genes- A gene that makes a DNA sequence that resembles a gene but has been mutated into an inactive form over the course of evolution. A **Pseudogene** shares an evolutionary history with a functional gene and can provide insight into their shared ancestry.

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Example Drosophila Jingwei gene (PGAM4).

(a) Oncogenes- A gene that is a mutated (changed) from of a gene involved in normal cell growth. Oncogene may cause the growth of cancer cells. Mutations in genes that become oncogenes can be inherited or caused by being exposed to substances in the environment that cause cancer.

(Example- HER 2 oncogene)

(d) SRY gene- SRY, **the master sex-determining gene,** is most commonly trans located from the short arm of the Y chromosome onto the X, causing male-to-female 46, XX ovotesticular DSD. Mutations in the coding region of the gene are also responsible for a significant proportion of 46, XY DSD cases.

253. Interferons are

(a) Complex protein
(b) Anti-clotting protein
(c) Anti-bacterial protein
(d) Anti-viral protein

Karnataka CET-2007

Ans. (d) : Interferons are group of signaling produced by virus infected cell. They interfere with viral replication and hence named interferons. A virus infected cell released interfere induce antiviral state in the uninfected cell.

254. The protein products of tumour suppressor gene may:

(a) be present in non-cancerous cells
(b) cause signal cell death
(c) regulate the cell cycle
(d) All of the aobve

JIPMER-2015

Ans. (a) : Tumour, suppressor genes play a crucial role in regulating cell growth and preventing the formation of tumors. Their protein products are typically found in non-cancerous cells, and they help in regulate the cell cycle to ensure normal cell division and prevent uncontrolled growth.

255. Enveloped virus enters into host cells by

(a) injection own nucleic acid inside host cells
(b) by contact with cell receptor and endocytosis
(c) by phagocytosis
(d) fusion with the plasma membrane of host

UP CPMT-2006

Ans. (a) : Enveloped viruses are not stable outside of the human body and are typically transmitted by transfer of body fluid. In contrast, no enveloped viruses are much more stable and many can be transmitted by other mechanisms such as the injection own nucleic acid inside host cell, fecal oral route.

256. The Golgi complex plays a major role :

(a) in post translational modification of proteins and glycosidation of lipids
(b) in trapping the light and transforming it into chemical energy
(c) in digesting proteins and carbohydrates
(d) as energy transferring organelles

NEET-2013

Ans. (a) : The Golgi complex plays a major role in post translational modification of protein and glycosidation of lipid.

The golgi apparatus principally performs the function of packaging materials, to be delivered either to the intra-cellular targets or secreted outside the cell, materials to be packaged in the form of vesicles from the ER fuse with the cis face of the golgi apparatus and move towards the maturing face. Golgi apparatus is the important site of formation of glycoproteins and glycolipids.

257. In prokaryotic cells:

(a) internal compartments are absent
(b) nucleus is absent
(c) ribosomes are 70S
(d) all of the above

J&K CET-2004

Ans. (d) : Prokaryotic cells (greek pro-primitive + karyon - nucleus). Here primitive nucleus defined or incipient nucleus is present eg. Bacteria, blue-green algae and PPLO or mycoplasma, nucleus is absent.
Ribosomes are of 70S type (50S + 30S).

258. How many chromosomes are present in each of the following with respect to maize plant respectively ?

(1) Leaf epidermal cell
(2) Antipodal cell
(3) Endosperm cell
(4) Generative cell
(5) Egg cell
(6) Megaspore
(7) Microspore mother cell

(a) 10, 20, 10, 10, 10, 20, 30
(b) 20, 10, 30, 10, 10, 10, 20
(c) 20, 10, 10, 10, 20, 30, 10
(d) 30, 10, 20, 10, 20, 10, 10

TS EAMCET-2015

Ans. (b) : Maize and sorghum have same number of chromosomes 2n = 20
n = 10
Leaf epidermal (2n) = 20
Antipodal (n) = 10
Endosperm (3n) = 30
Generative cell = (n) = 10
Egg cell (n) = 10
Megaspore (n) = 10
Microspore mother cell = (2n) = 20

259. Study the following lists

	List-I		List-II
(A)	Golgi apparatus	(i)	Circular DNA molecule
(B)	Mitochondrion	(II)	synthesis of carbohydrates
(C)	Chromatophores	(III))	Modification of proteins
(D)	Cytoskeleton	(IV)	Pigments
		(V)	Proteinaceous structures

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The correct match is

	A	B	C	D
(a)	(II)	(IV)	(V)	(I)
(b)	(III)	(I)	(IV)	(V)
(c)	(V)	(II)	(IV)	(III)
(d)	(III)	(V)	(IV)	(I)

TS EAMCET-2015

Ans. (b) :

(A) Golgi apparatus	Modification of protein
(B) Mitochondrion	Circular DNA molecules
(C) Chromatophores	Pigments
(D) Cytoskeleton	Proteinaeous structure

260. Golgi apparatus is absent in

(a) yeast (b) liver cells
(c) higher plants (d) blue-green algae

Uttarakhand PMT-2011

Ans. (d) : Golgi apparatus is a small, sac like structure mainly found in tubular vesicles in Eukaryotic cells.These organelles are exclusively absent in Bacteria, Blue Green Algae.

261. The plastids which store oil are

(a) Amyloplasts (b) Rhodoplasts
(c) Chloroplast (d) Elaioplasts

UP CPMT-2013

Ans. (d) : Leucoplasts is a colourless plastid that synthesis monoterpene and also get differentiated into more specialized plastids such as amyloplasts, elaioplasts and proteinoplasts etc.

Elaioplast (colour less plastides) is a plastid which stores oil

262. The cancer of the epithelial cells is called

(a) leukemia (b) lipoma
(c) sarcoma (d) emphysema
(e) carcinoma

Kerala PMT-2008

Ans. (e) : Carinoma is a category of types of cancer that develop from epithelial cells. Specifically, a carcinoma is cancer that begins in a tissue that lines the inner or outer surfaces of the body, and that arises from cells originating in the endoderm, mesoderm of ectoderm, mesoderm or ectodermal germ layer during embryogenesis. Carcinomas occur when the DNA of a cell is damaged or altered and the cell begins to grow uncontrollably and become malignant.

Leukemia- (liquid cancer) or blood cancer cancer of bone marrow,

Sarcoma- Cancer that originates in supporting and connective tissues as bone, tendon, muscle

Emphysema- Lung cancer shortness of breath

Lipoma- A lump under the skin.

263. Continued exposure of vinyl chloride may cause cancer of the

(a) Liver (b) WBCs
(c) Lymphoid tissue (d) Spleen

CMC Vellore-2013

Ans. (a) : Exposure to vinyl chloride may increase a person's risk of developing cancer. Human and animal studies show higher rates of liver lung and several other types of cancer. Being exposed to vinyl chloride can effect a person's liver, kidney, lung, spleen, nervous system and blood.

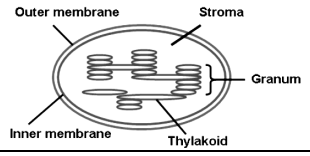
264. The structures that are formed by stacking of organized flattened membranous sacs in the chloroplasts are :

(a) Grana (b) Stroma lamellae
(c) Stroma (d) Cristae

AIPMT-2015

Ans. (a) : The structures that are formed by stacking of organized flattened membranous sacs (thylakoids) in the chloroplast are grana.

A chloroplast is a vesicle, bound by an envelope of two unit membranes and filled with a fluid matrix called **stroma**. The Lamellae, after separation from the Inner membrane, usually take the form of closed flattened, ovoid sacs, the thylakoids which lie closely packed in piles, the grana. Cristae are those twisted curving-shaped inner membranes in mitochondria where cellular respiration occur.



265. Identify the correct order of organisation of genetic material from largest to smallest

(a) Chromosome, genome, nucleotide,
(b) Chromosome, gene, genome, nucleotide
(c) Genome, chromosome, nucleotide, gene
(d) Genome, chromosome, gene, nucleotide

AIPMT (Re-Exam)-2015

Ans. (d) : The correct order of organization of genetic material from the largest to smallest.

Genome (haploid set of chromosome) → Chromosome (condensed chromatin)→ Gene (segment of DNA, unit of inheritance)→ Nucleotide (made up of pentose sugar, nitrogen base and phosphate).

A genome is an organism's complete set of DNA including all of its genes.

Each genome contains all of the information needed to build and maintain that organism.

This is the largest in the given options.

Chromosome are the thread like structures located inside the nucleic of animal and plant cells.

The building blocks of nucleic acids are the nucleotides.

A gene is the basic physical and functional unit of heredity.

266. Cellular organelles with membranes are

(a) Lysosomes, Golgi apparatus and mitochondria
(b) Nuclei, ribosomes and mitochondria
(c) Chromosomes, ribosomes and endoplasmic reticulum
(d) Endoplasmic reticulum, ribosomes and nuclei

AIPMT (Re-Exam)-2015

Ans. (a) : Lysosome. Golgi apparatus are single membrane bound organelles.

- Mitochondria, nucleic, chloroplast, are double membrane bound organelles.
- Ribosome is a non-membranous organelles. It is usually a aggregate form of r-RNA.
- Chromosome are the genetic material composed of nucleotides and histone proteins.

@apna_pdf

267. Which one of the following organelle in the figure correctly matches with its function?

(a) Rough endoplasmic reticulum, protein synthesis
(b) Rough endoplasmic reticulum, formation or glycoproteins
(c) Golgi apparatus, protein synthesis
(d) Golgi apparatus, formation of glycolipids

NEET-2013

Ans. (a) : The endoplasmic reticulum can either be smooth or rough, and in general its function is to produce protein for the rest of the cell to function, the rough endoplasmic reticulum has on it ribosomes, which are small, round organelles whose function it is to make these proteins.
Golgi apparatus is involved in the formation of glycolipid and glycoproteins.

268. Chlorenchyma found in: -
(a) Cytoplasm of Chlorella
(b) Mycelium of a green mould such as Aspergillus
(c) Spore capsule of a moss
(d) Pollen tube of Pinus

AIPMT-2003

Ans. (c): Chlorenchyma cells a type of living parenchymatous tissue, present only in plant cell, abundantly found in mesophyll of leaves and sometimes plants stem, possess abundant chloroplast. They are present in the spore capsule of moss, where they perform the function of photosynthesis.

269. Which of the following organelles contain DNA?
(i) Mitochondria (ii) Chloroplasts (iii) Golgi bodies (iv) Ribosomes
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i) only (d) (iv) only

AIIMS-2013

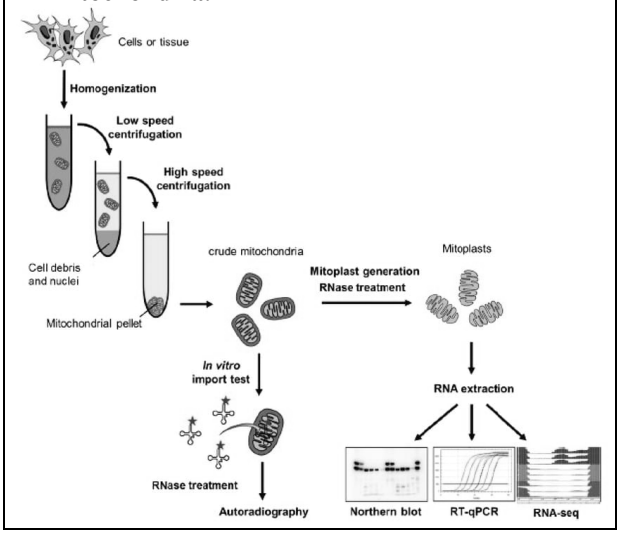
Ans. (a) : A eukaryotic cell has DNA in nucleus as well as cell organelles like mitochondria and chloroplasts. The DNA in cell organelles resembles prokaryotic DNA. The organelle DNA is present as a circular molecule while the DNA in nucleus is organized as linear structures, so they are called as semi autonomous organelle.

270. If a biochemical analysis of mitochondria has to done, the best procedure would be:
(a) Select cells which have a larger number of mitochondria
(b) Plasmolyse the cell and filter out the mixture an take the debris
(c) Grind the cells and filter out the mixture and take the debris
(d) Subject the cell to cell fractionation (centrifuge) and obtain mitochondria

AIIMS-2015

Ans. (d) : The best procedure would be to subject the cell to **cell fractionation** (centrifuge) and obtain mitochondria. Cell fractionation is a multistep process that subjects cells to centrifugal force in a spinning device called a **centrifuge**, which seperates organelles by their physical properties.

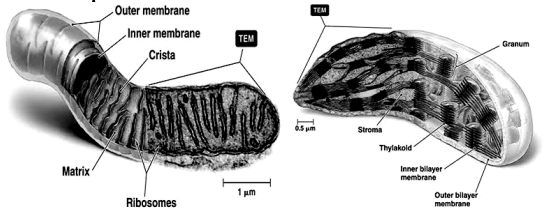
■ **Centrifugation of 5000 g, will sediment the mitochondria.**



271. DNA is present in
(a) Chromosomes and dictyosomes
(b) Chloroplasts and lysosomes
(c) Mitochondria and chloroplasts
(d) Mitochondria and endoplasmic reticulum.

AIIMS-2004

Ans. (c) : Mitochondria and **chloroplast** are both semi autonomous organelles with DNA.
• Mitochondria and Chloroplast are contain self DNA molecule. The DNA are small and circular double stranded. The mitochondrial DNA varies in size starting from 5 μm to 30 μm. Average length of **chloroplast DNA is 45 μm**.



Mitochondrial DNA vs Chloroplast DNA

272. The plant cell differs from the animal cell in:
(a) The presence of lysosomes
(b) The presence of large vacuole
(c) The absence of cellulosic cell wall
(d) The absence of chloroplast

Karnataka CET-2001

Ans. (b) : A plant cell has a rigid wall on the outside. It has plastids like chloroplasts, leucoplasts and chromoplasts and a centrally located large vacuole. All of these (cell wall, plastids vacuole) absent in an animal cell.

273. These type of vacuoles contain hydrolases:
(a) Sap (b) Contractile
(c) Food (d) Air

BCECE-2015

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Ans. (c) : Food vacuoles contain hydrolyzing enzymes as they are formed by fusion with lysosomes. The food is digested by hydrolyzing enzymes. Food vacuole or digestive vacuole formed by engulfing the food particles found in protist.
Contractile vacuole- Take part in osmoregualation and excretion as in Amoeba.
Air vacuole- Help in buoyancy of cell.
Sap vacuole- Store and concentrate mineral salts and nutrients.

274. The non-membranous organelles are:
(a) centrioles (b) ribosomes
(c) nucleolus (d) all of these

DUMET-2004

Ans. (d) : The nucleolus is a small, dense and spherical structure (lack membrane) present in the nucleus of the cell that is visible during the inter phase of the cell. Centrioles (lack membrane) which are right angled to each other and is composed of a protein known as tubulin.
Ribosome is a non-membranous cell organelle and present in eukaryotes and prokaryotes cells.

275. Match the following organelles in Group I with the structures in Group II. Choose the correct combination.

Group I		Group II
P. Mitochondrion	i.	Cisternae
Q. Golgi	ii.	Cristae
R. Chloroplast	iii.	Thylakoids
S. Centrosome	iv.	Radial spokes

(a) P-ii, Q-i, R-iii, S-iv
(b) P-iii, Q-i, R-ii, S-iv
(c) P-iv, Q-i, R-ii, S-iii
(d) P-iv, Q-ii, R-i, S-iii

KVPY SB & SX-2016

Ans. (a) :

Mitochondrion	—	Cristae
Golgi	—	Cisternae
Chloroplast	—	Thylakoids
Centrosome	—	Radial spokes

276. In which cell organelles the genome system is autonomous?
(a) Ribosomes and chloroplasts
(b) Mitochondria and chloroplasts
(c) Mitochondria and ribosomes
(d) Golgi bodies and ribosomes

AMU-2014
Manipal-2014

Ans. (b) : Mitochondria and chloroplasts are semi-autonomus cell organelles since they possess their own DNA and ribosomes (Protein) synthesizing machinery They arise from preexisting organelles and their functions are partially controlled by the cell's nucleus and the organelles themselves. Their DNA is prokaryotic type of DNA circular and single strandand.

277. The pH of protoplasm is :
(a) 6.0 (b) 6.8
(c) 7.8 (d) 8.2

Rajasthan PMT-1999

Ans. (b) : Protoplasm is clear translucent ordourless colourless. Crystallo – colloid type of solution. size of colloidal particles is 0.001 to 0.1 mm.
Protoplasm is the mixture of chemical substance as-sugar, salt, acids, bases, protein, lipid etc. The PH of protoplasm is considered nearly as 7. i.e. 6.8 pH

278. The vacuole in the plant cell contains:
(a) tonoplast (b) cell sap
(c) stroma (d) matrix

Manipal-2005

Ans. (a) : The vacuolar membrane named the tonoplast separates the cytoplasm from the vacuole lumen.
The largest cell compartment are vacuoles that accounts for up to 90% of plant cell volume. Cell sap contain dissolved sugar and salt which helps in maintaining osmotic pressure and store useful and also waste substances.

279. Direction: In the given questions a statement of Assertion (A) is given and a corresponding statement of Reason (R) is given just below it of the statement, mark the correct answer as: Assertion: Microsome is the collective name for cytoplasmic cell organelle obtained after centrifugation of the cell.
Reason: These are present in all normal cells.
(a) If both (A) and (R) true and (R) is the correct explanation of (A)
(b) If both (A) and (R) are true but (R) is not correct explanation of (A)
(c) If (A) is true but (R) is false
(d) If both (A) and (R) are false
(e) If (A) is false but (R) is true

Haryana PMT-2001

Ans. (c) : Microsomes or vesicle-like artifacts reformed from pieces of the endoplasmic reticulum when eukarytic cells are broken up in the laboratory. Microsomes are not ordinarily present in living cell. Microsomes can be concentrated and separated from other cellular debris by differential centrifugation where fractionation of cell by ultrasound waves occurs. Unbroken cells, nuclei and mitochondria sediment out at 10,000 g. Whereas soluble enzymes and fragmented ER, which contains cytochrome P 450 (CYP) remain in solution. At 100,000 g achieved by faster centrifuge rotation.

280. Which of the following is not function of Golgi body?
(a) Protein synthesis
(b) Formation of cell wall
(c) Formation of fatty acids
(d) Formation of plasma membrane

MGIMS Wardha-2012

Ans. (a) : The function of golgi bodies is the packaging and secretion of proteins. It receives proteins from ER. Golgi body cell wall formation, fatty acid formation, plasma membrane formation, but not protein synthesis.
Ribosome protein synthesis in the cell is take place by Ribosome.

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281. Role of carbohydrate in protoplasm

(a) as catalyst (b) for energy
(c) as enzymes (d) for synthesis

MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (b) : Protoplasm is a complex mixture of proteins carbohydrates, lipids and nucleic acid. The proteins are responsible for the cells structure the carbohydrate for its energy the lipids for its membrane and the nucleic acids for its genetic information.

282. Zone of exclusion surrounds

(a) Golgi apparatus (b) Centriole
(c) Nucleus (d) Iysosome

J&K CET-2011

Ans. (a) : Golgi apparatus is present in all ekaryotic cells except the RBC and sieve tube elements. Golgi apparatus is surrounded by a zone of exclusion in which ribosome's mitochondria, plastids, storage granules etc are absent.
Centrioles play a role in organizing microtubules that serve as the cells skeletal system.
Lysosome breakdown / digestion of macromolecules. Nucleus the brain of cell.

283. Sperm acrosome is derived from

(a) Golgi bodies
(b) Endoplasmic reticulum
(c) Iysosome
(d) Mesosome

J&K CET-2011

Ans. (a) : The sperm acrosome is derived from golgi bodies. It plays a important role in the fertilization process by containing enzymes that help the sperm penetrate and fuse with egg's outer layer.

284. Choose the matched ones.

(A) Vibrio – Rod like bacteria
(B) Mesosome – Helps in cell wall formation
(C) Smooth endoplasmic reticulum – Synthesis of lipid
(D) Vacuoles – Rich in hydrolytic enzymes

(a) (B) and (C) only
(b) (A) and (D) only
(c) (A), (B) and (C) only
(d) (B) and (D) only
(e) (B), (C) and (D) only

Kerala PMT-2014

Ans. (a) :
(a) Vibrio — Comma-shaped bacteria
(b) Mesosome — Helps in cell wall formation
(c) Smooth endoplasmic reticulum — Synthesis of lipid
(d) Vacuoles — Help maintain water balance

285. Engulfing of solid materials by cells is called?

(a) pinocytosis (b) phagocytosis
(c) active transport (d) autolysis

WB JEE-2015

Ans. (b) : Phagocytosis is a type of endocytosis that involves the engulfing of solid materials by cells.
• Active transport is the movement of molecules or ions across a membrane from a region of lower concentration to a region of higher concentration assisted by enzyme.
Autolysis more commonly known as self digestion.

286. Consider the following statements.

(a) The endomembrane system includes mitochondria, chloroplast and peroxisomes.
(b) Smooth endoplasmic reticulum is the major site for synthesis of lipid.
(c) Rough endoplasmic reticulum is actively involved in protein synthesis.
(d) Mitochondrial matrix possesses single circular DNA, a few RNA and 80S ribosomes.

Of the above statements

(a) (a) and (b) alone are correct
(b) (a) and (c) alone are correct
(c) (b) and (d) alone are correct
(d) (c) and (d) alone are correct
(e) (b) and (c) alone are correct

Kerala PMT-2013

Ans. (e) : Mitochondria, chloroplast and peroxisomes are not the part of Endomembrane system. it includes lysosome, ER, golgi complex vacuoles because their functions are coordinated with each-other.
Smooth E.R is major site for synthesis of lipid. Rough E.R is actively involved in protein synthesis. Mitochondrial matrix possess its own ribosomes. (The 70 S in nature) It synthesized some of its own structural protein.

287. Select the matched ones.

(a) Amyloplasts – store proteins
(b) Mitochondrion – 'powerhouse' of the cell
(c) Stroma – chlorophyll pigment
(d) Axoneme – 9 + 2 array

(a) (a) and (c) only (b) (b), (c) and (d) only
(c) (c) and (d) only (d) (a) and (d) only
(e) (b) and (d) only

Kerala PMT-2013

Ans. (e) :
(a) Amyloplasts — Synthesis and storage of starch
(b) Mitochondrion — Powerhouse of the cell
(c) Stroma — Help support organs and give structure
(d) Axoneme — 9 + 2 arrangement

288. I. It is a membrane bound space found in the cytoplasm
II. It is bound by a single membrane called tonoplast
III. It contains water, sap, excretory products and other materials not useful to the cell
IV. It has higher concentration of sap than the cytoplasm

The above statements apply to

(a) Golgi apparatus (b) Lysosomes
(c) Endoplasmic reticulum (d) Vacuoles
(e) Mesosomes

Kerala PMT-2013

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Ans. (d) : Vacuoles are membrane-bound spaces found in the cytoplasm of eukaryotic cells. They are bound by a single membrane called tonoplast and contain water, sap, excretory products and other materials not useful to the cell.

* Vacuoles typically have a higher concentration of sap than the cytoplasm.

H. Cell Membrane and Cell Wall

289. Fluid mosaic model for cell membrane was proposed by

(a) Singer and Nicholson (b) Robert Brown
(c) Watson and Crick (d) Beadle and Tatum

Tripura JEE-2019, 2018
VMMC-2011 / CMC Vellore-2010
AMU-2009, 1999 / BCECE-2007
Rajasthan PMT-2006, 2003
DUMET-2006 / JCECE-2005
Manipal-2000

Ans. (a) : Fluid mosaic model of the cell membrane was proposed by Singer and Nicholson in 1972.

- Robert Brown Discovered nucleus
- Watson and Crick's Model stated that the two strands of the double helix DNA are held together by hydrogen bonds between nitrogenous bases on opposite strands.
- Beadle and Tatum hypothesis is known as the one gene one enzyme

290. The main components of plasma membrane are

(a) lipids and proteins
(b) lipids, proteins and carbohydrates
(c) lipids only
(d) proteins only

BVP-2008 / Uttarakhand PMT-2007
MGIMS Wardha-2005 / Rajasthan PMT-2003
UP CPMT-2005

Ans. (b) : The main components of plasma membrane are lipid, proteins and carbohydrates. It is the outer covering of animal cell but in plant cell it is situated below the cell wall.

291. In gram positive bacteria cell wall is made up of

(a) cellulose (b) protein
(c) murein (d) lipid

HP CET-2013 / Rajasthan PMT-2003
Punjab MET-1999 / Haryana PMT-2001
Karnataka CET-2001

Ans. (c) : In gram positive bacteria cell wall is made up of Peptidoglycan (NAM – N – Acetyl muramic acid) also known as mucopeptide or murein. Its thickness is about 20 to 80 nm.

292. The thickness of unit membrane is

(a) 20 Å (b) 35 Å
(c) 55 Å (d) 75 Å

BCECE-2014
BHU PMT (Screening)-2009
Uttarakhand PMT-2009
VMMC-2009

Ans. (d) : According to Robertson's concept of unit membrane, plasma membrane has a trilaminar structure in which transparent lipid bilayer is surrounded on either side by dense proteins. It has a thickness of about $75 \overset{0}{A}$ with a central lipid layer of $35 \overset{0}{A}$ in thickness and two peripheral layers of $20 \overset{0}{A}$ each.

293. The recent model for plasma membrane proposed by Singer and Nicolson is :

(a) molecular-lipid model
(b) lamellar model
(c) unit membrane mode
(d) fluid mosaic model

HP CET - 2011 /BCECE - 2006
VMMC - 2005 / AMU - 2004

Ans. (d) : The recent model for plasma membrane proposed by singer and Nicolson fluid mosaic model. According to this model they describes membranes as being bilayers of phospholipids in which the hydrophobic groups are turned inwards to face each-other and protein molecules are embedded in it.

294. Carrier proteins are involved in :

(a) transport of enzymes
(b) water transport
(c) active transport of ions
(d) passive transport of ions

BVP-2014, 2003 / BCECE-2006
VMMC-2005 / AMU-2004

Ans. (d) : Active transport is the movement of a substance across a membrane against its concentration gradient It requires energy for that process unlike channel proteins which only transport substances through membranes passively, carrier proteins can transport ions and molecules either passively through facilitated diffusion.

Carrier proteins are proteins that carry substances from one side of a biological membrane to the other. Many carriers proteins are found in a cells membrane, through they may also be found in the membranes of internal organelles such as the mitochondria, chloroplasts, nucleolus and others.

295. Fluid mosaic model exhibits amphipathy because of

(a) glycoproteins (b) phospholipids
(c) lipids (d) glycolipids

AMU-2011
MGIMS Wardha-2011
BHU PMT (Screening)-2011

Ans. (b) : Fluid mosaic exhibits amphipathy due to phospholipids as they have both hydrophobic and hydrophilic groups. Phospholipid consists of two parts i.e. head and the two tails. The head is composed of phosphate molecule that is attracted to water (hydrophilic in nature) and the two tails are made up of fatty acids that are repel water (hydrophobic in nature).

296. Identify the correct option

Statement - I : Excessive dosage of cocaine causes hallucinations.

Statement - II : Intake of cocaine does not causes euphoria

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(a) Statement I is correct and II is wrong
(b) Statement I is worng and II is correct
(c) Statements I and II are wrong.
(d) Statement I and II are correct

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Hallucination is a perception of having seen, heard, touched tested or smelled something that was not actually there. Cocaine is also known as coke. It is a strong stimulant mostly used as a receational drug.

297. A specific organism [A] showing the lack of cell wall, survive without oxygen, pleomorphic. The other organism [B] has cell wall embedded with silica and indestructible. A and B respectively belong to

(a) Actinomyces. Diatoms
(b) Mycoplasma, Chrysophytes
(c) Cyanobacteria, Dinoflagellates
(d) Archaebacteria, Desmids

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : Mycoplasma– The organism without a cell wall and can live without oxygen are mycoplasmas.
Mycoplasma is the simplest and the smallest of the free living prokaryotes.
Chrysophytes– Chrysophytes are protists that resemble plants and are typically found in freshwater and marine habitats with low calcium.
While some species are amoeboid without any cell walls, others have cellulose cell walls that are reainforced by silica compounds.

298. Which of the following sentences are true

A. The chromosome number of meiocyte in housefly is 6.
B. The chromosome number of gamete in Rat is 21.
C. The chromosome number of meiocyte of fruitfly is 8.
D. The chromosome number of a leaf cell in maize is 20.

(a) ABC (b) BCD
(c) CDA (d) ABCD

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : • The chromosome number of meiocyte in housefly is (2n) = 12.
• The chromosome number of gamete in Rat is 21.
• The chromosome number of meiocyte of fruitfly is 8.
• The chromosome number of a leaf cell in maize is 20.

299. Identify the incorrect statements regarding cell membranes

A. The hydrophilic head of lipids is present towards inner side of cell membrane.
B. The lipids of cell membrane are made of phosphoglycerides
C. Cell membranes may also contain carbohydrates
D. The quasi fluid nature of lipids does not enable lateral movement of proteins with in the bilayer

(a) AD (b) AB
(c) CD (d) BC

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : The hydrophilic head is composed of a choline structure (blue) and a phosphate (orange). This head is connected to a glycerol (green) with two hydrophobic tails (purple) called fatty acids.
• The lateral movement of proteins is caused by the quasi-fluid nature of lipids.

300. The movement of water through the cell wall is known as _____

(a) Tonoplast (b) Apoplast
(c) Plasmolysis (d) Symplast

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The process of movement of water outside the plasma membrane and in the intercellular space is called as apoplastic pathway or apoplast.
Tonoplast is a single membrane that bounds the vacuoles and separates it from cytoplasm.
Plasmolysis is a process of contraction or shrinkage of the protoplasm of a plant cell and is caused due to the loss of water in the cell.
The symplast of a plant is the region enclosed by the cell membranes, within which water and solutes can diffuse freely.

301. The following enzymes are used to digest to the cell wall of a bacterium, green plant and fungi respectively

(A) Lysozyme
(B) Cellulose
(C) Chitinase
Options:

(a) B, A, C (b) A, C, B
(c) C, A, B (d) A, B, C

TS EAMCET-30.07.2022 Shift-I

Ans. (d) : Lysosome is an enzyme that cleaves peptidoglycan in bacterial cell wall.
The cell wall of all plants contain cellulose. Cellulose is a enzymes which is used to digest or break down of the cellulose.
Chitinases are generally found in organism that either need to reshape their own chitin or dissolve and digest the chitin of fungi.

302. Which of the following is not correct in relation to addiction and dependence?

(a) The TDA abuse leads to addiction and dependence.
(b) With the repeated use of TDA, the tolerance level of the receptors present in our body increases.
(c) Dependence leads the patients to implement all social norms.
(d) Dependence is the tendency of the body to manifest a characteristic and unpleasant condition, if the regular dose of drugs or alcohol is abruptly discountinued.

AP EAPCET-12.07.2022 Shift-I

Ans. (c) : Addiction is a neuropsychological attachment due to alcohol and drug effects. It consists euphoria and the temporary feeling of well being. It makes the people to have drug or alcohol even when there is no need dependence is the ability of the body to manifest the characteristics and unpleasant with drawl syndrome if regular does of drug or alcohol is discontinued.

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Dependency can lead to feelings of depression, agitation, anger and anxiety.

Drug addiction includes → alcoholism, nicotine addiction, food addiction, opioid addiction.

303. Which type of substance would face difficulty to pass through the cell membrane?

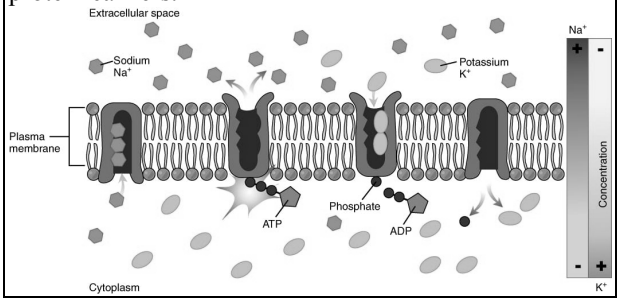
(a) Substance with hydrophobic moiety
(b) Substance with hydrophilic moiety
(c) All substance irrespective of hydrophobic and hydrophilic moiety
(d) Substance soluble in lipids

NEET (Re-Exam)-04.09.2022

Ans. (b) : Hydrophilic substance finds itself difficult to pass thought the membrane as it is not lipid soluble.

• Large polar or ionic molecules, which are hydrophilic, cannot easily cross the phospholipids bilayer.

Hydrophilic substances that dissolve in water can pass through the membrane only with the help of facilitating protein carriers.



304. Match the following lists.

List-I	List-II
A. Algal cell	**I. Protects and gives shape**
B. Pteridophyte cell	**II. Cellulose, galactans, mannans**
C. Calcium pectate	**III. Cellulose, hemicelluloses and pectin**
D. Cell wall	**IV. Holds as glue with neighbouring cells**

The correct match is:

	A	B	C	D
(a)	II	III	IV	I
(b)	III	II	I	IV
(c)	II	I	IV	III
(d)	IV	III	II	I

TS EAMCET-09.08.2021 Shift-II

Ans. (c) : Algal cells are made up of Cellulose, Galactans, Mannans and Calcium carbonate.

Cell wall is a rigid covering that protects the cell; provides structural support and gives shape to the cell. Eg-All plants cell wall.

The middle lamella is a layer mainly of calcium pectate which holds or glues the different neighbouring cells together.

Cell wall is made up of cellulose, pectin and hemicellulose.

305. What are the common characters of both prokaryotic and eukaryotic cells?

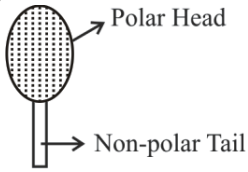
(A) Cytoplasm **(B) Plasma membrane**
(C) Mitochondria **(D) Cellulose cell wall**
(E) Meiotic cell division

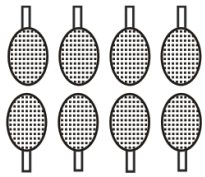
(a) B, C, D (b) A, B
(c) C, D, E (d) B, E

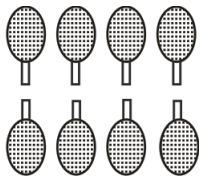
TS EAMCET-09.08.2021 Shift-II

Ans. (b) Prokaryotic cells are primitive cells mainly found in unicellular organism. Prokaryotic cells lack membrane bounded cell organelles and true nucleus is also absent. Cellulosic cell is absent in prokaryotes they possess a cell wall made up of peptidoglycan. Sexual reproduction is absent in prokaryotes so there is no meiotic cell division take place. Prokaryotes have plasma membrane and cytoplasm with scattered genetic material called nucleoid but eukaryotic cells have a true nucleus and all membrane bounded organelles, The cell organelles and nucleus is embedded in the cytoplasm the cell is covered with the plasma membrane which is covered by cell wall except animal cells.

306. The lipid molecules present in plasma membrane have polar heads and non-polar tails (as shown in figure) which option represents the correct arrangement of lipids in lipid bilayer?



(a)


(b)


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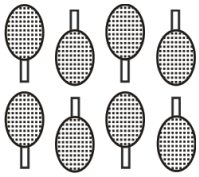
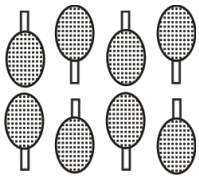


(d)


AP EAMCET-05.10.2021 Shift-I

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Ans. (b) : Plasma membrane consists of lipids (phospholipids and cholesterol), proteins and carbohydrates. Lipid is amphipathic that is they have a hydrophilic (water-loving) polar end and a hydrophobic (water-fearing) or non-polar end. Lipid molecules consist of head and tail. The head is polar hydrophilic lies toward the protein and held by hydrogen and ionic bond. The tails lie towards the centre non-polar and hydrophobic held by Vander wall force it ensure that non-polar tails of saturated hydrocarbon protective from Aqueous environment.

307. Polyribosomes are _____.

(a) total number of ribosomes in the cell.
(b) devoid of r-RNA .
(c) number of ribosomes linked to m-RNA.
(d) not capable of helping in the synthesis of polypeptide chain.

MHT CET-07.10.2020 Shift-I

Ans. (c) : Polyribosomes are number of ribosomes linked to m-RNA. They consist of a complex of an mRNA molecule and two or more ribosomes that act to translate mRNA instructions into polypeptides.

308. Which one of the following groups of drugs is called cannabinoids ?

(a) Marijuana, hashish, charas
(b) Morphine, heroin, LSD
(c) Heroin, hashish, cocaine
(d) Barbiturates, amphetamines, benzodiazepines

MHT CET-06.10.2020 Shift-I

Ans. (a) : Marijuana, hashish, charas and ganja are obtained from the flower tops, leaves and the resin of cannabis plants. They contain chemicals called cannabinoids and are generally taken as inhalation or oral ingestion to effect cardiovascular system of the body.

309. A membrane that allows the passage of solvent molecules but not the passage of solute molecules is called _____ membrane.

(a) differentially permeable
(b) impermeable
(c) freely permeable
(d) semi-permeable

MHT CET-07.10.2020 Shift-I

Ans. (d) : Permeable or freely membrane is a membrane which allows the movement of both the solvent and solute across it. Semi permeable membrane permits the passage of pure solvent molecules to pass through it and not the solute particles. A differentially permeable membrane only allows certain substances to pass through it. An impermeable membrane is one through which no substance can pass.

310. Assertion (A) : Lipids are separated into the acid insoluble fraction along with other polymeric substances.
Reason (R) : Cell membranes are composed of lipids and are not water soluble.
Hence, form is vesicles along with acid insoluble pool.
The correct option among the following is.

(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-29.09.2020 Shift-I

Ans. (a) : Lipids are fatty compounds that perform a variety of functions in your body.
Lipids are separated into the acid insoluble fraction because when we grind a tissue in trichloroacetic acid, cell membrane and other membranes are broken into pieces and form vesicles which are not water soluble. Example – waxes, oils, fats, hormones etc.

311. Identify the incorrect matching:

(a) Crack-interferes with the transport of the neuro-transmitter dopamine
(b) Benzodiazepines-hypnotic(sleep-inducing), anxiolytic
(c) smack-addictive and considered most dangerous opiate
(d) Pethidine-Semisynthetic opiates

AP EAMCET-24.09.2020 Shift-I

Ans. (d) : Pethidine injection is a type of medicine called an opioid analgesic. Pethidine is a synthetic substance. Pethidine is employed in the treatment of postanesthetic shivering. Pethidine also known as meperidine is a worldwide analgestic for treating labor pain.

312. Match the column I and II

Column I	Column II
(A) K.C. Mehta	**(i) Fluid mosaic model**
(B) P. Maheshwari	**(ii) First recombinant plasmid**
(C) Cohen and Boyer	**(iii) Haploid culture**
(D) Singer and Nicolson	**(iv) Rust disease**

(a) (A) - i, (B) - iii, (C) - ii, (D) - iv
(b) (A) - iv, (B) - iii, (C) - ii, (D) - i
(c) (A) - i, (B) - ii, (C) - iii, (D) - iv
(d) (A) - ii, (B) - iii, (C) - iv, (D) - i

AIIMS-25.05.2019 Shift-I

Ans. (b) : K.C. Mehta:- He Investigated the effects of temperature on rust fungi growth. He performed his research in the field of fungus-induced plant rusting, which changes the colour of plant leaves from green to brown, red or orange.

- **P. Maheswari:-** He Discovered the production of haploid anther culture. Haploid cells are excellent tools to study gene function as they contain a single copy of the genome and are thus unable to mask the effect of mutations.
- **Cohen and Boyer:-** They Discovered recombinant DNA technology. A recombinant DNA molecules are produced by joining together two or more DNA segments usually originating from different organisms.
- **Singer and Nicolson:-** Proposed the fluid mosaic model of the cell membrane. According to this model membranes are made up of lipids, proteins and carbohydrates. The main lipid membrane components are phospholipids.

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313. Plasma membrane is

(a) Semipermeable and symmetric
(b) Selectively permeable, elastic and asymmetric
(c) Permeable and asymmetric
(d) Selective permeable with monolayer phospholipids

SRM JEEE-2019

Ans. (b) : Plasma membrane, also called the cell membrane. Plasma membrane is selectively permeable, elastic and asymmetric. It is also selectively or differentially permeable. Semipermeable means half permeable because it regulates the movement of substances in and out of the cell i.e. plasma membrane will allow free transport of solvent like water across it but will not allow free transport of solute particles.

314. Assertion (A): Syncytium is the result of karyokinesis not followed by cytokinesis.
Reason (R): In plant cell. middle lamella formation starts from centre and grows outwards of the cell and leads to cell wall formation.
Options:

(a) (A) and (R) true and (R) is the correct explanation of (A).
(b) (A) and (R) true. but (R) is not the correct explanation of (A).
(c) (A) is true, (R) is false.
(d) (A) is false, (R) is true.

AP EAMCET-24.04.2019 Shift-II

Ans. (b) : Generally, cell division is completed by cytokinesis after karyokinesis in mitosis. Some times Karyokinesis is not followed by the process of cytokinesis that is nucleus division is not followed by cell division then a multinucleate condition occurs, which leads to the formation of syncytium. Coconut liquid endosperm is an example of a syncytium.
Middle lamella is a layer rich in pectin which cement the cell walls of adjacent plant cells and form plasmodesmata connections.

315. Match the following

	List-I		List-II
A.	**Morphine**	**1.**	**Atropa belladonna**
B.	**Hallucinogenic**	**2.**	**Erythroxylum**
C.	**Cannabinoids**	**3.**	**Papaver somniferum**
D.	**Cocaine**	**4.**	**Cannabis sativa**

The correct answer is

	A	B	C	D
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iii)	(i)	(iv)	(ii)
(c)	(iv)	(i)	(iii)	(ii)
(d)	(iv)	(iii)	(ii)	(i)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) :
Morphine is obtained from *Papaver somniferum.* It is the main opium alkaloid.
Atropa belladonna is a poisonous plant, also called deadly nightshade. Its toxic substances cause euphoria and hallucinations.
Canabinoids are obtained from inflorescences of the plant *Cannabis sativa*.
Cocaine is a powerfully addictive stimulant drug, it is obtained from *Erythroxylum coca*.

316. What is the role of sterol in cell membrane?

(a) Stability
(b) Communication with other cells
(c) Secretion
(d) Transport

JIPMER-2018

Ans. (a) : Sterols are known as steroid alcohols an example of which is cholesterol. Sterol are amphipathic lipids. The basic role of sterol in cell membrane is to provide stability, it also regulate biological processes and sustain the domain structure of cell membranes where they are considered as membrane reinforcers.

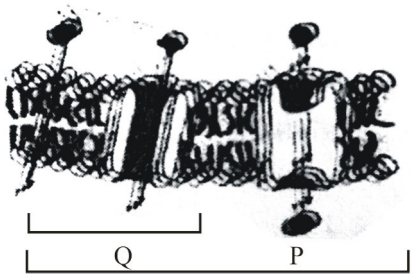
317. Assertion (A): The "Fluid Mosaic model" proposed by Singer and Nicolson indicated that the quasi-fluid nature of lipid enables lateral movement of proteins within the overall bilayer
Reason (R): In the cell wall of a young plant cell, the primary wall is capable of growth, which gradually diminishes as the cell matures and the secondary wall is formed on the inner side of the cell.
Which of the following is true?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-I

Ans. (b) : Singer and Nicolson (1972) gave the modern concept about the structure of plasma membrane, fluid mosaic model according to which the quasi-fluid nature this ability to move within the membrane is measured as its fluidity. This ability to move within the membrane is called fluidity and is important for cell growth.

318. Identify 'P' and 'Q' in the given diagram.



(a) P = Facilitated diffusion
Q = Simple diffusion
(b) P = Facilitated diffusion
Q = Active Transport
(c) P = Simple diffusion
Q = Passive transport
(d) P = Simple diffusion
Q = Active transport

GUJCET-2018

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Ans. (a):
(P) Facilitated diffusion:– Facilitated diffusion is the movement of hydrophilic molecules-or ions across the plasma membrane. The diffusion is facilitated by transport protein i.e. (carrier proteins or pore proteins).
(a) Simple diffusion:- Simple diffusion is when ion or molecule diffuse from an area of high concentration, to an area of low concentration.
Active transport:- Active transport is the process of moving molecules across a cellular membrane through the use of cellular energy.

319. Choose the correct group of organisms based on their cell wall materials respectively- Cellulose, Peptidoglycan, Algin, Mycolic acid and Pseudomurein.
(a) Claviceps, Bacillus, Ulothrix, Corynebacterium, Laminaria
(b) Ulothrix, Bacillus, Laminaria, Corynebacterium, Arechaebacteria
(c) Laminaria, Archaebacteria, Ulothrix, Bacillus, Corynebacterium
(d) Bacillus, Corynebacterium, Ulothrix, Laminaria, Archaebacteria

AP EAMCET-25.04.2018 Shift-II

Ans. (b) : Ulothrix is an example of green algae having barrel shaped or cylindrical cells. The cell wall of green algae is composed of propectin and cellulose.
Bacillus is a type of bacterial cell or bacteria. Bacterial cell is made up of peptidoglycan, often known as mureine.
Laminaria belongs to the phaeophyceae. The cell wall of Laminaria is made up of cellulose and algin.
The cell wall of **Corynebacterium** and **Mycobacterium** specieses are made up of mycolic acids.
Pseudomurein is present in the cell wall of **methanogenic archaebacteria**.

320. Energy is used in which of the following ?
(a) Active absorption
(b) Passive absorption
(c) Diffusion
(d) None of the above

Tripura JEE-2017

Ans. (a) : Active absorption is the absorption of water by roots using adenosine triphosphate produced by root respiration ; It is called active absorption because the roots cells actively participate in the process.
Diffusion- The movement of molecule from a region of higher concentration to a region of lower concentration.

321. Plant cell wall is made up of
(a) Cellulose, hemicelluloses and pectin
(b) Cellulose and Pectin
(c) Cellulose, hemicelluloses and chitin
(d) Cellulose only

SRM JEEE -2017

Ans. (a) : Cell wall is non-living, rigid structure forms an outer covering for plasma membrane of fungi & plant. Primary cell wall is a thin layer of the cell wall, composed of cellulose, pectin and hemicelluloses and secondary cell wall of the plant cell wall is made up of cellulose, xylan, glucomannan and lignin.

322. Which of the following is not a characteristic of facilitated transport?
(a) Uphill transport
(b) Highly selective
(c) Requires special membrane proteins
(d) Transport saturates

Karnataka CET-2017

Ans. (a) : Facilitated transport is the passive transport of the certain ions or the molecules through special membrane proteins called as channel proteins. The movement of molecule is therefore highly selective. The transport depends on the concentration gradient or the saturation limit. The uphill transport is an example of the active transport in which transport of molecules involves against to the concentration gradient .

323. lipids are insoluble in water, because lipid molecules are:
(a) neutral (b) Zwitter ions
(c) hydrophobic (d) hydrophilic

WB JEE-2006

Ans. (c) : Lipids are non-polar, bilayered, water insoluble molecules. High one hydrophobic in nature due to their non-polar ends i.e they are insoluble in water while water is a polar molecule, so there is no way for water to attach to lipid molecule. Instead, the non-polar lipids will bind to themselves which is why oils and fats form droplets on the surface of the water.

324. Nuclear membrane is continuous with
(a) rough endoplasmic reticulum
(b) smooth endoplasmic reticulum
(c) cell membrane
(d) Golgi bodies

Punjab MET-2009

Ans. (a) : Rough endoplasmic reticulum (RER) is frequently observed in the cells which are actively involved in protein synthesis and secretion they are exertive and continuous with the outer membrane of the nucleus. Smooth endoplasmic reticulum (SER) is a major site for synthesis of lipid. In animal cells lipid like steroidal hormones are synthesized in SER.

325. Teichoic acid is present in
(a) cell wall of Gram positive bacteria
(b) cell wall of Gram negative bacteria
(c) capsid of virus
(d) protoplasm of mycoplasma

Punjab MET-2009

Ans. (a) : Teichoic acid is present in the cell wall of the G^+ bacteria. It comprises a huge percentage in the cell wall of G^+ bacteria. The main function of teichoic acid is to provide flexibility to the cell-wall by attracting cations (calcium and potassium). It is sensitive to antibiotic like penicillin which attacks the cell wall.

326. Cell wall of fungi is made up of
(a) fungal cellulose (b) hemicellulose
(c) fungal chitin (d) Both (a) and (c)

Punjab MET-2009

Ans. (d) : The fungal cell wall is composed of fungal cellulose and mainly chitin. Chitin is a polymer of N-acetyl glucosamine. Cellulose is not present in the cell wall of fungi but a type of fungal cellulose may be present in their cell wall.

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327. N–acetyl muramic acid is found in
(a) Cells wall component of plant
(b) Cell wall component of Gram positive bacteria
(c) Cell wall component of fungi
(d) Viral coat material

WB JEE-2012

Ans. (b) : N-Acetylmuramic acid (NAM) is a part of the peptidoglycan polymer of bacterial cell walls in gram positive bacteria. It is the structural component of the bacterial cell wall.

328. Lipid bilayer is present in:
(a) plasma membrane (b) ribosome
(c) chromosome (d) nucleolus

Punjab MET-2006
Rajasthan PMT-2004

Ans. (a) : Plasma membrane is a trilamellar layer. Trilamellar layer concept is based on the trilamellar modal for the plasma membrane which is suggested by Davson and Danielli, in 1935. According to that and other models a bilayer of lipid is present in the centre of the plasma membrane and are surrounded by single layer of protein to their each side. Lipid bilayer is a thin polar membrane made of two layers of lipid molecules.

329. Which of the following lacks cell wall?
(a) Gametes (b) Amoeba
(c) Mycoplasma (d) All of these

BHU PMT-2002

Ans. (d) : Cell wall is the outer covering of all plants, fungi and some bacterial cell, it surrounds the plasma membrane. Cell wall is not found in animal cell.
Like all prokaryotes mycoplasma lacks the cell wall, mycoplasma is a genus of bacteria.
Amoeba lacks a cell wall like other protozoans.
Cell wall absent in gametes also.

330. In middle lamella, which substance is present in large quantity:
(a) Cutin (b) Suberin
(c) Pectin (d) None of these

Rajasthan PMT-1996

Ans. (c) : The most abundant matter of the middle lamellas of the cell is calcium and pectin. The middle lamella is made up of pectin that joins the cell wall of the two neighboring cells together. It gives stability to the plants. Middle lamella contains **calcium** and **magnesium pectates**.

331. In 1994 Nobel prize for the discovery of protein in cell membrane was awarded to:
(a) Fischer and Krebs
(b) Martin Loother and Nelson
(c) Stuart and Bital
(d) Gilman and Rodbell

Rajasthan PMT-1996

Ans. (d) : The Nobel prize in physiology or medicine in 1994 was accorded jointly to Alfred G. Gilman and Martin Rod bell for their discovery of G- Proteins and the role of these proteins in signal transduction of cells. G proteins are also known as guanine nucleotide-binding proteins. They are located in the plasma membrane that binds the extracellular substances and transmits signal from these substances to an intracellular molecule that is G protein.

332. Who gave the term 'plasmalemma' ?
(a) C. Nageli (b) J. Q. Plower
(c) C. Kramer (d) Nicolson

UP CPMT-2010

Ans. (b) : The term 'plasmalemma' was given by J.Q. Plower in 1931. Plasmalemma is also known as cell membrane or plasma membrane. It protects the cell from external environment mediates cellular transport and transmits cellular signal.

333. Liquid food drinking is
(a) imbibition (b) pinocytosis
(c) phagocytosis (d) none of these

BVP-2008
Uttarakhand PMT-2007

Ans. (b) : Pinocytosis is a process by which liquid droplets are ingested by living cells by the cellular invagination whereas phagocytosis means intake of solid by an animal cell. Pinocytosis is also called cell drinking whereas phagocytosis is called cell eating.

334. The inward movement of ions into the cells is ..... and the outward movement is .....
(a) influx; efflux
(b) efflux; influx
(c) absorption; adsorption
(d) adsorption; absorption

AFMC -2009

Ans. (a) : Ions present in the cells are show movement and that type of movement of ions in the cell is called flux. It occurs via two types influx movement and efflux movement. The inward movement of ions inside the cell is called influx and the outward movement is called efflux.

335. Which of the following pairs is correctly matched –
(1) Stimulants - Benzedrine and methedrine
(2) Opiates - Ganja, charas
(3) Depressants - Nembutal and seconal
(4) Hellucinogens - Opium and heroin
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2009

Ans. (d) : Benzedrine and methedrine are stimulants
Nembutal and seconal are depressants.
Opiates are the derivatives of opium. Heroin is a synthetic opiate.
Ganja and charas are hellucinogens.

336. Primary wall of cell wall is composed of (1) cellulose (2) Hemicellulose (3) pectin (4) protein
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011
AMU - 1999

Ans. (a) : Primary cell wall is composed of →
(1) Cellulose (25%), (2) Hemicellulose (50%), (3) Pectin (25%).
Cell wall provides structural support and protection to the cell. In secondary cell walls, lignin may be deposited. Secondary cell wall located between the primary cell wall and the plasma membrane.

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337. Opiate narcotics drugs are

(a) Antianxiety (b) Analgesic
(c) Hypnotic (d) Antihistamine

J&K CET-2008

Ans. (b) : Opiate narcotics drugs are a type of analgestic drug. They bind to opioid receptors in the central nervous system. Narcotics are now called opioids. Opioids are a broad group of pain-relieving drugs that work by interacting with opioid receptors in your cells.

338. The drug useful to increase cardiovascular effects in human being is

(a) Cocaine (b) Barbiturate
(c) Benzodiazetine (d) Insulin

J&K CET-2008

Ans. (a) : Cocaine is drug which is use to increase cardiovascular effect in human being. When we take cocaine in small amount or at low doses then it induced sympathetic effects, increase heart rate, blood pressure and myocardial contractibility, leading to increased myocardial oxygen demand.

339. Heroin in extracted from

(a) Erythroxylum coca (b) Cannablis sativa
(c) Papaver somniferum (d) Atropa belladonna

J&K CET-2008

Ans. (c) : Heroin is obtained by the acetylation of morphine, which occurs as a natural product in opium: the dried latex of certain poppy species eg. *Papaver somniferum*. Heroin is a crude preparation of diamorphine.

340. Simultaneous movement of two molecules across a membrane in the same direction is known as

(a) antiport (b) symport
(c) uniport (d) biport

DUMET-2010

Ans. (b) : Simultaneous movement of two molecules across a membrane in the same direction is known as – symport. The movement of two molecules across the membrane in the opposite direction is called antiport.
The movement of an independent molecule across the membrane is called uniport.

341. Which of the following cell organelle remains enveloped by a single unit membrane ?

(a) Mitochondria (b) Lysosomes
(c) Nucleus (d) Chloroplast

HP CET-2011
MGIMS Wardha-2010

Ans. (b) : Lysosomes are single membrane bounded structure or cell organelles. Mitochondria, chloroplast and nucleus are double membranous structures.

342. Which of the following plant cells is not surrounded by a cell wall?

(a) Root hair cell (b) Stem hair cell
(c) Gamete cell (d) Bacterial cell

BHU PMT (Screening)-2009
VMMC-2009
Uttarakhand PMT-2009

Ans. (c) : The sex cells of the flowering plant are called gametes it is not surrounded by a cell wall. Root hair cells are surrounded by a thin and freely permeable cell wall and stem hair cell and bacterial cells are also possess cell wall.

343.

(i) They help in respiration
(ii) They help in cell wall formation
(iii) They help in DNA replication
(iv) They increase surface area of plasma membrane

Which of the following prokaryotic structures has all the above roles?

(a) Chromosome (b) Ribosome
(c) Mesosome (d) Lysosome
(e) Polysome

Kerala PMT-2015

Ans. (c) : Mesosomes aer formed by the infolding of the bacterial cell membrane. Mesosome is analogous to eukaryotic mitochondria. It helps in respiration, cell wall formation and increase the surface area of the cell membrane. It play a role in cell division. DNA replication and protein synthesis.

344. Cellulose is the major component of cell walls of

(a) Pythium (b) Xanthomonas
(c) Pseudomonas (d) Saccharomyces

BHU PMT (Screening)-2010

Ans. (a) : Pythium is a genus of the class oomycetes, which are also known as "water molds".
The cell wall of Pythium and most of the oomycetes are composed of cellulose and β-1, 3 glucan with minimal amounts of chitin.

345. A cell will experience the highest level of endosmosis when it is kept in

(a) distilled water (b) salt solution
(c) sugar solution (d) protein solution

KVPY SA-2012

Ans. (a) : When a cell is kept in distilled water the concentration of the solute inside the cell is more than outside and then due to endosmosis water will enter inside the cell. After the maximum amount of water enters the cell, the cell bursts as it can no longer absorb water.

346. Which one of the following is not a constituent of cell membrane?

(a) Cholesterol (b) Glycolipids
(c) Proline (d) Phospholipids

Rajasthan PMT-2010

Ans. (c) : Cell membrane is a biological membrane. Cell membrane is also known as plasma membrane or cytoplasmic membrane and historically referred to as 'plasmalemma'. Cell membranes are made up of lipids (that is Phospholipids, cholesterol and Glycolipids) and protein (that is Glycoproteins, enzymes and transport proteins). Proline is an amino acid that is generally not a constituent of any biological membrane.

347. Na^+/K^+ pump in a cell is an example of

(a) osmosis (b) diffusion
(c) passive transport (d) active transport

AMU-2010

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Ans. (d) : The sodium-potassium pump goes through cycles of shape changes to help to maintain a negative membrane potential. The sodium – Potassium pump is an example of active transport because energy is required to move the sodium and potassium ions against the concentration gradient.

348. Cell wall is outer covering of plant cell made up of cellulose it is:
(a) semi permeable (b) permeable
(c) non permeable (d) all of these

HP CET-2013

Ans. (b) : The cell wall of plant cell is made up of cellulose, a linear polymer of glucose. Cell wall of the plant cell is permeable in nature because it allows both solvent and solute molecules to pass through it.

349. In many bacteria, the cell membrane becomes invaginated and folded to form
(a) pill (b) cristae
(c) fimbriae (d) mesosomes

AMU-2005

Ans. (d) : Bacteria are prokaryotic. Cell membrane of the bacterial cell wall invaginate to form a structure called mesosomes. Mesosomes are discovered by F. James. It is analogous to eukaryotic mitochondria. It play an important role in bacterial cell i.e. It help in respiration.

350. Chitin is present in the cell wall of
(a) Fungi (b) Bacteria
(c) Yeast (d) Algae

AMU-2009

Ans. (a) : The fungi had chitin in their cell walls while the green plants had a cellulosic wall. Chitin form a rigid cell wall. It provide structural stability to fungal cell walls.

351. Which is correct for the structure of cell wall of bacteria and fungi ?
(a) Both are made up of cellulose
(b) Both have mucopeptide
(c) Both are made up of N-acetyl glucosamine
(d) None of the above

AMU-2009

Ans. (c) : Cell wall is the outer covering of fungal cell wall and bacterial cell wall.
Fungal cell wall is made up of chitin, which is a polymer of N-acetyl glucosamine.
N- acetyl muramic acid and N-acetyl glucosamine are the repeating units that make up peptidoglycan, which is a component of the bacterial cell wall.

352. The membrane which allows passage of certain substances more readily than others is termed as
(a) permeable (b) selectively permeable
(c) semipermeable (d) impermeable

VMMC-2005
AMU-2004

Ans. (b) : A membrane which allows certain substances to pass through but does not allow other to pass through it is called a selectively permeable membrane (SPM). It allows the passage of only certain types of molecule through diffusion and occasionally by facilitated diffusion.

353. Diatomaceous earth is obtained from
(a) Bacillarophyceae (b) Xanthophyceae
(c) Rhodophyceae (d) Chrysophyceae

JIPMER-2013

Ans. (a) : Diatomaceous earth is obtained from Bacellariophyceae or diatoms or Golden Brown algae.
Diatomaceous earth most commonly used for polishing, filtration of drugs, oil and syrups and also in the manufacturing of toothpaste and bricks.

354. The secretion of macromolecules by fusing a transport vesicle to the plasma membrane is
(a) pinocytosis (b) phagocytosis
(c) endocytosis (d) exocytosis

BHU PMT (Screening)-2011

Ans. (d) : A process by which the secretion of Macromolecules by fusing a transport vesicle to the plasma membrane takes place is called exocytosis. Exocytosis is also known as cell vomiting or ephagy.

355. During endocytosis,
(a) the cell divides its cytoplasm during mitosis
(b) the cell digests itself
(c) the cell engulfs and internalises materials using its membrane
(d) the cell enables the extracellular digestion of large molecules

Manipal-2009

Ans. (c) : The term " Endocytosis" was coined by Christian deDuve in 1963. It is a cellular process in which substances are brought in to the cell. In this process material is transported into the cells by formation of vesicles. It include two essential similar processes i.e. phagocytosis and pinocytosis. Phagocytosis is the bulk ingestion of solid food while pinocytosis is the ingestion of liquid food materials.

356. Electroporation involves
(a) promotion of seed germination by induced imbibitions of water with electric current
(b) making transient pores in cell membrane to facilitate entry of gene constructs
(c) purification of saline water with the help of an artificial membrane
(d) passage of sucrose through sieve pores by electro-osmosis

DUMET-2009

Ans. (b) : Electroporation is a technique in microbiology where an electric field is applied to a cell to increase the permeability of its cell membrane and they allow the entry of the chemicals drug or DNA molecules into the cell. This versatile method can be used for all cell types and for transfection of DNA, RNA, mRNA, RNPs or proteins,.

357. L.S.D. is obtained from :
(a) Claviceps purpurea
(b) Rauwolffia serpentine
(c) Papaver somniferum
(d) Cannabis sativa

Haryana PMT-2003

Ans. (a) : Lysergic acid diethylamide (LSD) is synthetically derived from the fungus *Cleviceps purpuria*. LSD was first synthesized by Albert Hofmann

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in 1938. LSD are powerful hellucinogens. That change mood, behavior and thoughts they may cause pleasant or unpleasant semation in the body, they effect cerebrum and sense organ and produce euphoria.

358. Stramonium is a drug obtained from the plant species of :

(a) Datura (b) Ocimum
(c) Rauwolffia (d) Asphodelus

Haryana PMT-2003

Ans. (a) : Stramonium drug is obtained from Datura and the drug stramonium was known as narcotic. **D. stramonium** is a plant with both poisonous and medicinal properties and has been proven to have great pharmacological potential with a great utility and usage in folklore medicine.

359. An enzyme carrier protein associated with cell membrane

(a) Lipase (b) Amylase
(c) Permease (d) Catalase

VMMC-2008
AMU-2008

Ans. (c) : Carrier protein and channel proteins are the two major classes of membrane transport proteins carrier proteins (also called carriers, permeases or transporters) bind specific solutes and transfer them across the lipid bilayer by undergoing conformational changes that expose the solute-binding site sequentially on one side of the membrane and then on the other.

360. Pits are formed on the cell wall is due to lack of

(a) Cell plate
(b) Primary wall material
(c) Secondary wall material
(d) Middle lamella

J&K CET-2007

Ans. (c) : Pits are formed on the cell wall due to lack, of secondary wall material. Pits are then connections seen on the plant cell walls the structure of pits includes-pit membrane, pit cavity and pit aperture. They allow the flow of water and nutrients from one element to another, linking water in roots with transpiration in leaves.

361. Lipid molecules in plasma membrane are arranged in which manner ?

(a) Scattered (b) Series
(c) Alternate (d) Head parallel

VMMC-2007

Ans. (d) : In the plasma membrane lipid molecular are arranged in head parallel manner i.e. head of both lipid layer towards the outside. Lipids are an essential component of the cell membrane. The structure is typically made up of a glycerol backbone, 2 fatty acid tails (hydrophobic) and a phosphate group (hydrophilic). It forms the lipid bilayer.

362. In Singer and Nicolson model of plasma membrane/the extrinsic proteins are:

(a) tightly associated with intrinsic protein and can be easily separated
(b) loosely associated with intrinsic protein and can be easily separated
(c) Loosely associated with intrinsic protein and cant be easily separated
(d) tightly associated with intrinsic protein and cant be easily separated

BCECE-2002

Ans. (b) : In singer and Nicolson model of plasma membrane the extrinsic proteins are loosely associated with intrinsic proteins and can be easily separate. They are situated entirely outside of the phospholipid bilayer. They are held by the cell membrane by weak molecular attraction.

363. Cell Adhesion and cell recognition occur due to biochemicals of cell membrane named

(a) lipids
(b) proteins
(c) glycoproteins and glycolipids
(d) proteins and lipids

AMU-2003

Ans. (c) : Glycoproteins and glycolipoids are proteins and lipids that are present on the outer surface of the cell membrane with carbohydrate group attached to them respectively. cell recognition is a cell's ability to distinguish one type of neighboring cell from another and cell adhesion is the ability of a single cell to stick to another cell or an extracellular matrix (ECM).

364. On which surface of cell Donnan equilibrium occur?

(a) Tonoplast (b) Cell wall
(c) Plasma membrane (d) Nuclear membrane

GUJCET-2015

Ans. (c) : Plasma Membrane – Plasma Membrane is selectively permiable membrane. The resting membrane potential occurs across plasma membrane. Due to selectively permeability there is a high concentration of anions present across the cell membrane. This creates donnan equilibrium. It is also called as Gibbs - Donnan equilibrium. In other words, it is an uneven distribution of ions on one side of semi permeable membrane.

Thus, the correct answer is option (c).

a) Cell wall– The cell wall is the protective, semi–permeable outer layer of plant cell. The major function of the cell work is to give the cell strength and picture and to filter molecules that pass in and out of the cell. A cell is the smallest part of an organism that still contain that organism's elements.

b) Tonoplasts– It is a semi permeable membrane surrounding a vacuole in a plant cell. It is mainly involve in regulating the movement of ions around the cell and isolating materials that might be harmful or a threat to the cell.

d. Nuclear Membrane– A nuclear membrane is a double membranous structure. It serves to separate the chromosomes from the rest of the cell. The nuclear membrane includes an array of small holes or pores that permit the passage of certain materials such as nucleic acids and proteins, between the nucleoplasm and cytoplasm.

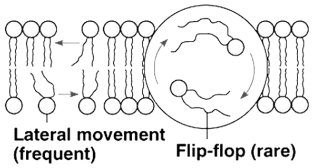
365. Keeping in view the "fluid mosaic model" for the structure of cell membrane, which one of the following statements is correct with respect to the movement of lipids and proteins from one lipid monolayer to the other (described as flip-flop movement)?

@apna_pdf

(a) While proteins can flip-flop, lipids cannot
(b) neither lipids, nor proteins can flip-flop
(c) Both lipids and proteins can flip-flop
(d) While lipids can rarely flip-flop proteins cannot

AIPMT-2008

Ans. (d) : Fluid mosaic model of membranes states that membrane components are free to diffuse in the plane of the membrane. Some of the membrane proteins are restricted to specific regions of the membrane by interactions with cytoskeletal proteins. The lipids in the bilayer can sometimes undergo transverse diffusion or "flip-flop movement" to go from one layer to the other that means rarely flip-flop of the phospholipids occur. This does not occur with the protein.

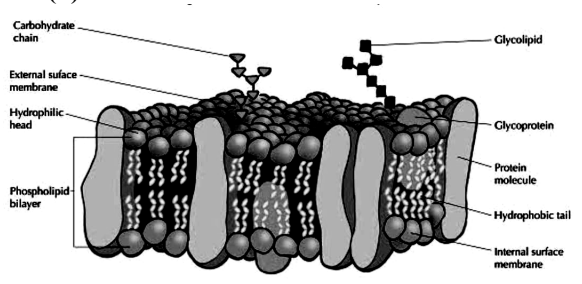


(a) Movement of phospholipids

366. Which one of the following is not a constituent of cell membrane ?
(a) Phospholipids (b) Cholesterol
(c) Glycolipids (d) Proline

AIPMT-2007

Ans. (d) :



Proline is the only proteinogenic secondary amino acid which is a secondary amine, as the nitrogen atom is attached both to the α- carbon and to a chain of three carbons that together form a five membered ring. It is not present in the cell membrane.

- Proline improves skin texture and aids collagen formation and helps to contain the loss of collagen during aging.
  The biological membranes are essentially made up of lipids and proteins. The three main lipid constituents of cell membranes are phospholipids, glycolipids and sterols.
- The phospholipids contain a phosphate moiety in the hydrophilic head. They can be distinguished into glycerophospholipids with a glycerol backbone and a sphingo-phospholipids based on 4 sphingosine.
- Glycolipids contain one or more monosaccharide residues and are based on 4-sphingosine or ceramide.
- The steroids are sterol alcohols which contain a cyclopentanone perhydrophenanthrene nucleus, cholesterol is the most common sterol in animal cell membranes.

367. The plasma membrane consists mainly of –
(a) phospholipids embedded in a protein bilayer
(b) proteins embedded in a phospholipid bilayer
(c) proteins embedded in a polymer of glucose molecules
(d) proteins embedded in a carbohydrate bilayer

AIPMT (Screening)-2010

Ans. (b) : S. J. Singer and G.L. Nicholson proposed fluid mosaic model of membranes in 1972. According to this model, the membranes are not a uniform depositition of lipids and proteins.
Protein molecules occur at both place inside and on the outer side of lipid bilayer –"Protein icebergs in a sea of lipids." i.e –Proteins embedded in the phospholipid bilayer.

368. Middle lamella is composed mainly of :
(a) Phosphoglycerides
(b) Hemicellulose
(c) Muramic acid
(d) Calcium pectate

AIPMT-2009

Ans. (d) : Middle lamella is a pectin layer. It is a cementing layer of the plant cell wall that holds together adjacent cells. It is usually made up of calcium and magnesium pectates. Plants need this to give them stability and so that they can form plasmodesmata between the cells. It is the first formed layers which is deposited at the time of cytokinesis. The cell plate that is formed during cell division itself develops into middle lamella.

369. Cell wall consists of
(a) Lignin, hemi cellulose, pectin and lipid
(b) Lignin, hemi cellulose, pectin and cellulose
(c) Lignin, hemi cellulose, protein and lipid
(d) Hemi cellulose, cellulose, tubulin and lignin

Karnataka CET-2007

Ans. (b) : Cell Walls consist of Lignin, hemi cellulose, pectin and cellulose.
Cellulose→ It is an important component of plant cell that provide rigidity to the plant stems leaves and branches. They are present in the cellulosic micro fibril walls.
Hemicellulose→Hemicellulose is a mixture of polymerised xylans, mannans,glucomannans, galactans xyloglucans and arabinogalactans.
It binds microfibrils with matrix.
Pectin → Pectin is the filler substance of matrix. It is mixture of polymerised and methylated, galacturonic acid and neutral sugars.

370. Keeping in view the structure of cell membrane, which one of the following statements is correct with respect to the movements of liquid and proteins from one liquid monolayer to the other (flip flop movement).
(a) While proteins can flip flop, liquids can not
(b) Neither lipids, nor proteins can flip flop
(c) Both lipids and proteins can flip flop
(d) While lipids can rarely flip flop, proteins can not

JIPMER-2015

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Ans. (d) : The movement of lipid molecules from one monolayer to another is called flip-flop motion. The mobility of membrane proteins due to the fluid property of the lipid bilayer was demonstrated by the classical experiment of D Fry and M Edin (1970). Lipid molecules rarely transfer from one lipid monolayer to another monolayer of the lipid bimolecular layer. Hence flip-flop motion is rarely observed in lipid molecules whereas it is completely absent in proteins.

371. Select the correct statement from the following regarding cell membrane:

(a) Lipids are arranged in a bilayer with polar heads towards the inner part
(b) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson
(c) Na^+ and K^+ ions move across cell membrane by passive transport
(d) Proteins make up 60 to 70% of the cells membrane

AIPMT (Screening)-2012

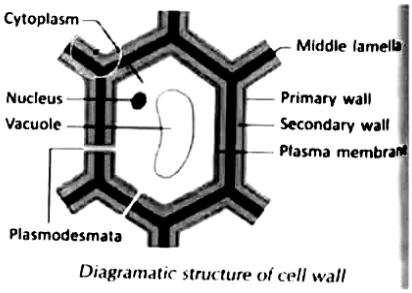
Ans. (b) : In 1972 Singer and Nicholson proposed fluid mosaic model for internal structure of plasma membrane.
This is most widely accepted model of plasma membrane.
According to this model a membrane consists of continuous bilayer of phospholipid molecules in which globular proteins are embedded.
The lipids are arranged in a bilayer with polar heads towards outside and non-polar tails towards Inside.

372. Element necessary for the middle lamella

(a) Ca (b) Zn
(c) K (d) Cu

AIPMT-2001

Ans. (a) :



Diagramatic structure of cell wall

- Middle lamella is a jelly-like substances made up of calcium and magnesium pectate. Middle lamella is the first formed layer, present between the two adjacent cells. It is situated outside of the primary cell wall.

373. The right sequence of carriers, which involve in the transport of excess Na^+ ions out of the cell in salt resistant plants, is

(a) Uniporter, Symporter
(b) Symporter, Antiporter
(c) Antiporter, Uniporter
(d) Uniporter, Antiporter

AP EAMCET-2010

Ans. (d) : The right sequence of carriers which involved in the transport of excess Na+ ion out of the cell in salt resistant plants are **Uniporter and Antiporter**.
Uniporter is a membrane transport protein that transports a single species of substrate (Charged or uncharged) across a cell membrane.
Antiporter is a membrane protein that transports two molecules at the same time in the opposite direction.

374. Cell membrane controls:

(a) exocytosis
(b) endocytosis
(c) both exocytosis and endocytosis
(d) not controles movement of substances

UP CPMT-2006
JCECE-2008

Ans. (c): The cell membrane or plasma membrane is a biological membrane that separates the interior of the cell from the outside environments. In this way, it is selectively permeable to ion and organic molecule. The plasma membrane is selectively permeable. It regulates what passes from one side to the other. A plasma membrane provides some protection to the inside of cell but its main function is to control the passage of substance into and out of cell.

375. Ultraphagocytosis (colloidopexy) is intake by cell of

(a) Chromagen particles
(b) Small colloidal particles
(c) Large colloidal particles
(d) It is very quick phagocytosis

VMMC-2008

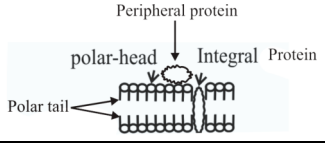
Ans. (b) : Phagoytosis or cell eating is the process by which a cell engulfs a solid particle and digests it .
Phagocytosis occurs in specialized cells in which plasma membrane ingests macrophages, neutrophils and other white blood cells (smaller colloidal particles).
Ultraphagocytosis is uptake of macromolecules and larger energy rich particles but intake by cell of small colloidal particle.

376. In fluid mosaic model of plasma membrane

(a) Upper layer is non-polar and hydrophilic
(b) Polar layer is hydrophobic
(c) Phospholipids form a bimolecular layer in middle part
(d) Proteins form a middle layer

AIPMT-2002

Ans. (c) : Fluid mosaic model of the plasma membrane was proposed by S. J. Singer and Garth L. Nicolson 1972.
According to this model, the plasma membrane is a phospholipid bilayer in which the proteins cholestrol and carbohydrates are incorporated which give it a mosaic like appearance. In Phospholipids layer upper or outer part like hydrophilic and polar heads of the lipid molecules are arranged on the outer side and inner side of the bilayer hydrophobic & non-polar tails are present. The lipid bilayer acts as a barrier to the passage of molecules and ions into and out of the cell.



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377. According to widely accepted "fluid mosaic model" cell membranes are semi-fluid, where lipids and integral proteins can diffuse randomly. In recent years, this model has been modified in several respects. In this regard, which of the following statements are incorrect

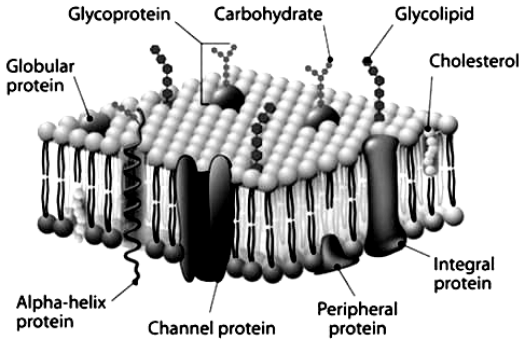
(a) Proteins can also undergo flip-flop movements in the lipid bilayer
(b) Many proteins remain completely embedded within the lipid bilayer
(c) Proteins in cell membranes can travel within the lipid bilayer
(d) Proteins can remain confined within certain domains of the membranes

AIPMT-2005

Ans. (a) : According to widely accepted "fluid mosaic model", the cell membranes are semi fluid, where lipid and integral proteins can diffuse randomly. In recent years this model has been modified in several aspect.

- Protein in cell membrane can travel within the lipid bilayer.
- Protein can remain confined within certain domains of the membranes
- Many proteins remain completely embedded within the lipid bilayer

The lipids in the bilayer can sometimes undergo transverse diffusion or "flip-flop movement" to go from one layer to the other. This does not occur within the protein.



378. What is true about fluid mosaic model

(a) Phospholipid layer is sandwiched between two protein layers
(b) Phospholipid monolayer is present on the top of a protein layer
(c) Phospholipid bilayer is present on the top of a protein layer
(d) Proteins are embedded at places in the phospholipid bilayer

J&K CET-2004

Ans. (d) : According to fluid mosaic model protein molecules occurs in mosaic pattern i.e. protein iceberg in the sea of lipid or Gulabjamun in the concentration solution of the sugar. In fluid mosaic model there is a lipid bilayer having proteins embedded in them. The protein molecules moves latterly in the lipid layer not flip flop motion i.e. not from one lipid layer to the other lipid layer but lipid molecule really exhibit flip flop movement.

379. Which of the following is present between cell wall of the plant cells?

(a) Lomasome (b) Microsome
(c) Lysosome (d) Middle lamella

AIIMS-1999

Ans. (d) : Middle lamella is a cementing layer between neighbouring cells and the primary walls. It originates from the cell plate that occurs during cell division. Middle lamella is present between the cell walls of adjacent cells. It is usually made up of calcium and magnesium pectates.

380. Which one of the following is wrongly matched?

(a) Fungi - Chitin
(b) Phospholipid - Plasma membrane
(c) Enzyme - Lipopolysaccharide
(d) ATP - Nucleotide derivative
(e) Antibody - Glycoprotein

Kerala PMT-2009

Ans. (c) : Fungal cell wall is mainly composed of glucans, chitin and glycoproteins. Plasma membrane is composed mainly of phospholipids. They are arranged in two layers, called the phospholipid bilayer. Enzymes are proteins that act as biological catalyst by accelerating chemical reactions.
A single molecule of Adenosine triphosphate (ATP) is a nucleotide derivatives.
Immunoglobulins (Ig) or antibodies are glycoproteins produced by plasma cells.

381. Consider the following statements with reference to facilitated transport.

1. Requires ATP energy
2. Transport saturates
3. Highly selective
4. Requires special membrane properties
5. Uphill transport
Of the above statements

(a) 1, 2 and 3 are relevant but 4 and 5 are irrelevant
(b) 2, 3 and 5 are relevant but 1 and 4 are irrelevant
(c) 3, 4 and 5 are relevant but 1 and 2 are irrelevant
(d) 1, 4 and 5 are relevant but 2 and 3 are irrelevant
(e) 2, 3 and 4 are relevant but 1 and 5 are irrelevant

Kerala PMT-2012

Ans. (e) : Facilitated diffusion is a type of passive transport, no require of ATP energy which requires special type of membrane proteins to carry different molecules or ions across the membrane along from high concentration to low concentration. These proteins tend to be selective and associated with a few select molecules or ions. Since there is a limited quantity of such transport proteins, the degree to which this can lead to saturation if the concentration of the molecules, or ions. to be transported is extremely high. Thus facilitated diffusion is highly selective.
Active transport is called an uphill transport because it occurs against the concentration gradient. So the facilitated diffusion involves downhill (higher to lower concentration) movement of molecules with the help of special membrane proteins.

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382. The Singer model of plasma membrane differs from Robertson's model in the

(a) arrangement of proteins
(b) arrangement of lipid layers
(c) number of lipid layers
(d) absence of proteins in Singer model

AIIMS-1998

Ans. (a) : The Singer model of plasma membrane is differ from the Robertson's model in arrangement of protein Robertson proposed a trilaminar structure of plasma membrane according to which plasma membrane has a trilaminar structure in which transparent lipid bilayer is surrounded on either side by dense proteins with a difference in type for the outer and inner side while in fluid mosaic model which is given by Singer and Nicolson, proteins are of two types- integral or intrinsic and extrinsic. Intrinsic proteins are embedded in the phospholipid bilayer and extrinsic proteins are found on the surface of the membrane and are loosely associated with on layer of the phospholipid bilayer.

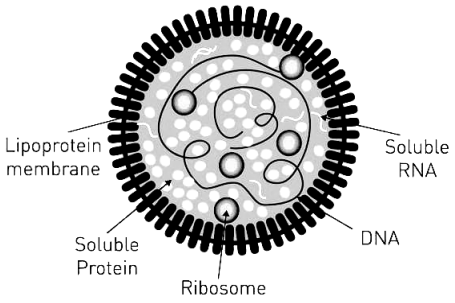
383. Cell wall is absent in

(a) Nostoc (b) Aspergillus
(c) Funaria (d) Mycoplasma

AIPMT (Re-Exam)-2015

Ans. (d) : Mycoplasma is a genus of bacteria that lack a cell wall around their cell membrane. They have the cell membrane as outermost layer.

Mycoplasma



- **Aspergillus** is a fungus having chitinous cell wall.
- **Funaria** is bryophyte having cellulosic cell wall.
- **Nostoc** is a cyanobacteria surrounded by cellulosic cell wall.

384. Cell membrane in animals is composed mainly of the molecule of :

(a) lipids (b) proteins
(c) lipids and proteins (d) carbohydrates

JIPMER-2006

Ans. (c) : Cell membrane consists of lipids, proteins and a small amount of carbohydrate. The ratio of protein and lipid varies considerably in different cell type.
Usually the ratio is 60% protein and 40% lipid.

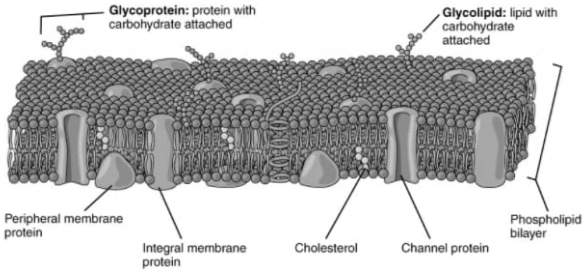
385. Which one of the following is correct for the transmembrane proteins in lipid bilayer of plasma membrane?

(a) They are absent in animal cells.
(b) They act as channel proteins
(c) They are absent in plant cells.
(d) They are only externally located.

AIIMS-2016

Ans. (b) : In the fluid mosaic model of plasma membrane, membrane protein can be classified as integral or peripheral.

- Integral membrane proteins are permanently embedded within the phospholipid bilayer of plasma membrane. They have a range of functions. Such functions include transporting molecules across the membrane.



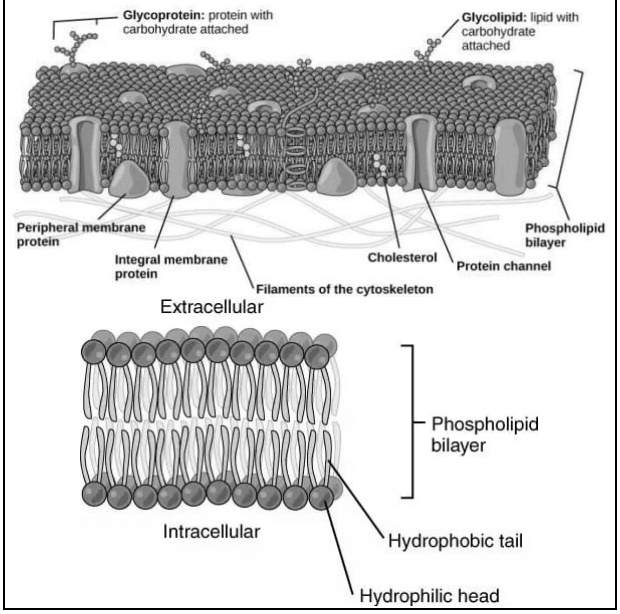
386. The property of semi permeability belongs to

(a) cell wall
(b) plasma membrane
(c) mitochondria only
(d) none of the above

AIIMS-2011

Ans. (b) : The cell membrane or the plasma membrane is the outer membrane present in all cells which separates the inside content of the cell from the external surroundings.

- It is semi-permeable in nature.
- A semipermeable membrane is a membrane that allows certain molecules or ions to pass through it by diffusion and occasionally specialized "facilitated diffusion" and prevents the entry or movement of other materials.



387. What are Singer and Nicolson known for?

(a) One-gene-one-enzyme hypothesis
(b) Plasma membrane modifications

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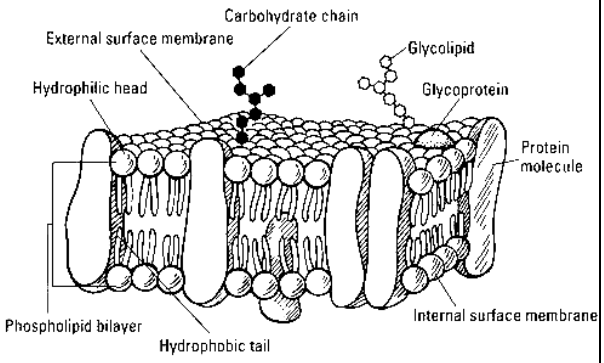
(c) Fluid-mosaic model of plasma membrane
(d) Structure of DNA

AIIMS-2010
BVP-2003

Ans. (c) : Fluid mosaic model which was proposed by singer and Nicolson in 1972.

- According to this model, the membrane does not have a uniform disposition of lipids and proteins. The phospholipid bilayer of plasma membrane is viscous and individual phospholipids can move position. The phospholipid bilayer is embedded with proteins, resulting in a mosaic of components.



Fluid Mosaic Model of Plasma membrane

388. According to fluid mosaic model, plasma membrane is composed of:
(a) Phospholipids and oligosaccharides
(b) Phospholipids and hemicellulose
(c) Phospholipids and integral proteins
(d) Phospholipids, extrinsic proteins and intrinsic proteins.

J&K CET - 2011
AIPMT-1989

Ans. (d) : According to the fluid-mosaic model the plasma membrane is composed of phospholipids, extrinsic proteins and intrinsic proteins. Intrinsic proteins are embedded in the phospholipid bilayer and extrinsic proateins are those proteins loosely bound to the membrane from outside in plasma membrane.

389. Addition of new cell wall particles amongst the existing ones is:
(a) Deposition (b) Apposition
(c) Intussusception (d) Aggregation

AIPMT-1991

Ans. (c) : Growth of cell wall involve the growth in surface area as well as growth in thickness. It occurs by two methods –
(1) Intussusception :– Intussusception is development or growth by the deposition of new materials between existing components of cell wall. Intussusception also involve cell elongation.
(2) Apposition :– Apposition is the addition of layers of cellulose to the inner surface of a plant cell wall, at its junction with the plasma membrane.

390. Cell recognition and adhesion occur due to biochemicals of cell membranes named:
(a) Proteins
(b) Lipids
(c) Proteins and lipids
(d) Glycoproteins and glycolipids

AIPMT-1993

Ans. (d) : Glycoproteins and glycolipids are proteins and lipids respectively. These are present on the outer surface of the cell membrane with a carbohydrate group attached to them and a responsible for cell recognition and adhesion. These are formed due to small carbohydrates molecules present on lipids and extrinsic proteins.

391. Active and passive transports across cell membrane differ in:
(a) Passive transport is nonselective
(b) Passive transport is along the concentration gradient while active transport is due to metabolic energy
(c) Active transport is more rapid
(d) Passive transport is confined to anions while active transport is confined to cations

AIPMT-1993

Ans. (b) : In biological system, there are two major phenomena – Passive transport and active transport. In active transport the movement of molecules occur across the cell membrane from a region of lower concentration to the region of higher concentration. It directly uses metabolic energy to transport molecules across the membrane. Passive transport is just opposite phenomena of active transport and there is no requirement of energy occurs. In passive transport molecules move along the concentration gradient.

392. The desmosomes are concerned with:
(a) Cell division (b) Cell adherence
(c) Cytolysis (d) Cellular excretion.

AIPMT-1995
VMMC-2002

Ans. (b) : Desmosomes are specialized and highly ordered membrane domains that mediate cell-cell contact and strong adhesion and in human and other vertebrates they are found in tissues exposed to intense mechanical stress.

393. Which of the following enzymes helps in crossing plasma membrane?
(a) protease (b) pepsin
(c) dehydrogenase (d) permease

JCECE-2006

Ans. (d) : The permease is an enzyme that facilitates diffusion of specific molecules across the plasma membrane passively and it increases the membrane porosity to support easy transport of the molecules and functions as an integral part of intercellular transport.
Pepsin is an aspartic protease using a catalytic as partate in its active site.
Protein is enzymes that break down protein.
Dehydrogenase is an enzyme belongs to class oxidoreductase act as catalyst.

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394. Protoplast lacks

(a) cytoplasm (b) nucleus
(c) plasma membrane (d) cell wall

Uttarakhand PMT-2010

Ans. (d) : Plant protoplasts are somatic plant cells without cell wall. Exposure of the naked protoplast membrane allows us to investigate more easily fundamental aspects of cell physiology and cell surface interaction with toxins and pathogens.

Protoplast contains cytoplasm along with cell membrane and nucleus. Protoplasts can be generated by stripping the cell wall from plant, bacterial or fungal cells by mechanical, chemical or enzymatic means.

395. Fluid mosaic model of plasma membrane was given by

(a) Robertson
(b) Robert Hooke
(c) Singer and Nicholson
(d) Pantia and Mast

Punjab MET-2008

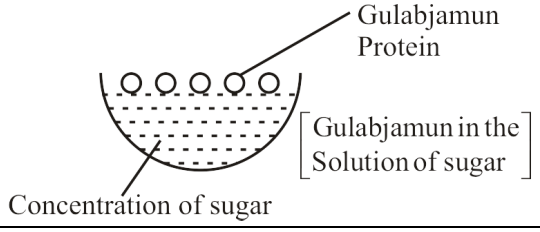
Ans. (c) : The fluid Mosaic model of the cell membrane was proposed by SJ singer and GL Nicolson in the year 1972. According to this model they describes membranes as being bilayers of phospholipids in which the hydrophobic groups are turned inwards to face each other and protein molecules are embedded in it Thus the proteins are seen as icebergs in the sea of lipids. It is the most acceptable model of the plasma membrane.

396. Identify the correct statement about the fluid mosaic model of cell membrane.

(a) It was proposed by J David Robertson in 1972
(b) Model resembles the iceberg (as proteins) floating in the sea (of phospholipids).
(c) Hydrophilic phosphate head of phospholipids face inwards.
(d) Hydrocarbon tails face out ward.

BCECE-2015

Ans. (b) : Fluid model proposed by – singer and Nicolson (1972) According this model proteins molecules occurs in mosaic pattern i.e. protein Iceberg in the sea of lipid or **Gulabjamun** in the concentration solution of the sugar. In fluid mosaic model there is a lipid bilayer having proteins embedded in them. The protein molecules moves latterly in the lipid layer not flip-flop motion i.e. not from 1 lipid layer to the other lipid layer but lipid molecules rarely exhibit flip-flop movement.



397. Desmosome is the modification of

(a) Golgi bodies
(b) endoplasmic membrane
(c) plasma membrane
(d) ER - nucleus complex

CG PMT-2005

Ans. (c) : Desmosmes are the modification of plasma membrane. These are just like welded areas between adjacent cells having intercellular thickening materials. They are trans-membrane linkers made up of disc-shaped intercellular thickening adjacent to each membrane. Protein processing within the golgi involves the modification and synthesis of the carbohydrate protein of glycoporteins. ER is composed of one completely continuous membrane bilayer.

398. Which part of the cell can contain N-acetyl glucosamine?

(a) Cell envelope (b) Cell wall
(c) Nucleus (d) Ribosomes

BCECE-2015

Ans. (b) : The cell wall of bacteria contains peptidoglycan which is made up of polysaccharide consisting of alternating N-acetylmuramic acid (NAM) and N-acetylglucosamine (NAG). N-acetylglucosamine is also present in the cell wall of fungi, which is the monomer of the polysaccharide chitin.

399. Structural lipids of cell membrane are

(a) simple lipid (b) chromolipids
(c) steroid (d) phospholipids

WB JEE-2011

Ans. (d) : Phospholipids are major constituents of cell number because they can form bilayar in water. It is made up of two hydrophobic fatty acid tail and a hydrophilic head consisting of phosphate group. The two constituents are joined by a glycerol molecule. It can easily form bilayer because of its amphiphilic nature. It has the hydrophobic fatty acid tail which does not interact with water and a hydrophilic phosphate + alcohol head which can interact with water. Phospholipids provide the basic structural organization of membrane.

400. Cystoliths are composed of:

(a) glucosides (b) calcium oxalate
(c) calcium carbonate (d) magnesium oxalate

DUMET-2003

Ans. (c) : Cystoliths are outgrowth of epidermal cell wall. They are visible as dots or variously shaped marks specially in pressed, dried leaves. They may serve as some kind of protection from leaf eating insects or other animals.

Cystoliths is the crystal of calcium carbonate that is formed in special cells called as lithocytes which is present in leaf of plants as *ficus elastica*. It helps in the regulation of calcium level in the plants.

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401. Which of the following statements is INCORRECT regarding biological membrane?
(a) It is composed of lipids and proteins
(b) Peripheral proteins are loosely associated with the membrane
(c) Integral proteins span the lipid bilayer
(d) Lipids and membrane proteins do not provide structural and functional asymmetry

KVPY SB & SX-2016

Ans. (d) : Plasma membrane is asymmetric due to oligosaccharides which forms glycoprotein & glycolipid along with proteins and the components of biological membranes are asymmetrically distributed between the membrane surface.
In biological membrane protein is 2 type –
Peripheral proteins, which are loosely associated with membrane, & integral protein which is span in lipid.

402. The most abundant substance of middle lemella is:
(a) Suberin (b) Cutin
(c) Lignin (d) Pectin

MP PMT-2013

Ans. (d) : Middle lamella is the part of cell wall that is the outermost layer in between cells. It is a layer that cements together the primary cell walls of two adjoining plant cells. Middle lamella is made up of calcium and magnesium pectate.
Pectin present in this layer is a heteropolysaccharide which helps to bind the two cells together it also helps in cell growth and cell wall.

403. Each phospholipid molecule in a cell membrane consists of:
(a) one polar head and two non-polar tail
(b) one polar head and one polar tail
(c) one non-polar head and one polar tail
(d) one non-polar head and one polar tail

J&K CET-2003

Ans. (a) : Plasma membrane consists of lipids (phospholipids and cholesterol), proteins and carbohydrates.
Each phospholipid molecule in a cell membrane consists of one polar head and two non-polar tail. The head is polar hydrophilic lies toward the protein and held by hydrogen and ionic bond.
The tails towards the centre non polar and hydrophobic held by vander wall force it ensure that non polar tails of sachurated hydrocarbon protective from aqueous environment.

404. The primary cell wall is mainly made up of
(a) Lignin (b) Pectin
(c) Cellulose (d) Protein

WB JEE-2014

Ans. (c) : The primary cell wall is composed of the polysaccharides cellulose, hemicelluloses and pectin. the structural integrity of a cell it provides protection against mechanical stress. Cellulose is a polysaccharide consisting of a linear chain of D-glucose.
A secondary cell wall is formed by the deposition of lignin.

405. Glycocalyx is associated with
(a) Nucleolus (b) Plasma membrane
(c) Nucleus (d) Nucleosome

J&K CET-2011

Ans. (b) : Glycocalyx is a surface layer that covers the cell membrane of many bacteria, epithelial cells or other cells. It is made up of glycoproteins, glycolipids and proteoglycans. It modulates adhesion between cells and also surface characteristics that determine adhesion and flow properties. Glycocalyx is mainly used in the recognition of the cell and also regulates the endothelial vascular tissues.
Plasma membrane also known as plasma lemma it is a thick, sticky layer. It regulates the transport of materials entering and exiting the cell.

406. Which of the following is responsible for the mechanical support, protein synthesis and enzyme transport?
(a) Endoplasmic reticulum
(b) Mitochondria
(c) Cell membrane
(d) Dictyosome

Haryana PMT-2000

Ans. (a) : Endoplasmic reticulum provides mechanical support to the cell, by maintaining its shape. Rough endoplasmic reticulum contains ribosomes on its surface, which are involve in protein synthesis. It facilities transport of materials from one part of the cell to another.

407. In which method of transport, in plasma membrane does not require carrier molecule?
(a) Active transport (b) Facilitated diffusion
(c) Simple diffusion (d) $Na^+ - K^+$ pump

WB JEE-2008

Ans. (c) : Simple diffusion occurs according to the differences in the concentration of molecules or along the concentration gradient. Diffusion means the transport of materials form a region of higher concentration to a region of lower concentration It does not require carrier molecules.
Simple diffusion can be disrupted if the diffusion distance is increases.
Facilitated diffusion is helped along a membrane transport channel. These channels are glycoproteins that allow molecules to pass through the membrane.
Active transport – it requires energy.
Na^+ P^+ pump is type of active transport that helps maintain resting potential in the cell.

408. What is the structural element of cell wall?
(a) Matrix (b) Microtubules
(c) Microfibrils (d) Arabinogalactans

WB JEE-2008

Ans. (c) : A microfibril composed of cellulose arranged in orthogonal layers. Cellulose is a straight chain polysaccharide composed of β(14) linked glucose subunits. It is a major component of plant cell walls, that makes the plant stems, leaves and dranches rigid, they are present in the form of cellulosic microfibrils in the inner layer of primary wall.

@apna_pdf

I. Endomembrane System

1. Which of the following cell organelles stores hydrolytic enzymes which act as acidic pH?

(a) Lysosome (b) Centriole
(c) Chloroplast (d) Nucleus

NEET-2016 Phase-II
BHU-PMT (Screening)-2011, 2009
VMMC-2011, 2002, 2007, 2009
Uttarakhand PMT-2009
CMC Vellore-2008 / CMC Ludhiana-2007
WB JEE-2006
Rajasthan PMT-2005, 2004, 1995
JIPMER-2004, 2012 / UP CPMT-2001, 2002
AMU-1999, 2006/ Punjab MET-2003, 1999
AIIMS - 2000 / AIPMT – 1993, 1996, 1994
BVP-2004, 2009 / Manipal-2001

Ans. (a) : Lysosomes contains a variety of acid hydrolases that are active at the acidic PH maintained with the lysosome.

2. The cell organelle covered by single unit membrane is:

(a) Lysosome (b) Mitochondria
(c) Chloroplast (d) Ribosome

TS EAMCET-30.07.2022 Shift-II
NEET-2016 Phase-I
MGIMS Wardha-2005 / VMMC-2005
UP CPMT-2005 / AMU-2004
AP EAMCET-2001 / Punjab MET-1999
Rajasthan PMT-1998, 1996,1995

Ans. (a) : The cell organelle covered by single unit membrane is lysosomes and vacuole.
→ Double unit membrane bound organelles Mitochondria + chloroplast.
→ Non- membrane bound organelle → Ribosomes.

3. Tonoplast is a membrane, which surrounds

(a) ribosome (b) Mitochondria
(c) Vacuole (d) Cytoplasm

UP CPMT-2012 / DUMET-2009
Kerala PMT-2009 / JIPMER-2009
CG PMT-2008
BHU PMT (Screening)-2009, 2006
Uttarakhand PMT-2009, 2005
BVP-2014, 2009, 2000

Ans. (c) : Tonoplast is membrane surrounds – vacuole.
→ The vacuole is the membrane- bound space found in the cytoplasm. It contains water, sap, excretory product and other material not useful for the all.

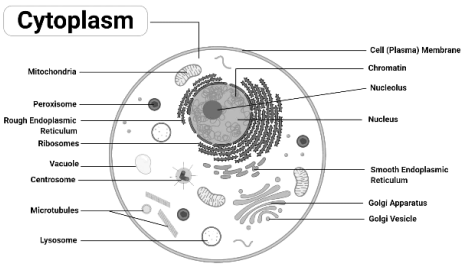
4. Synthesis of lipids and carbohydrates is regulated by-

(a) SER (b) RER
(c) Ribosomes (d) Lysosomes

AIIMS-25.05.2019 Shift-I
AIIMS-27.05.2018 Shift-I
AIIMS-26.05.2018 Shift-II
Rajasthan PMT-2006, 2001
CG PMT-2005 / J&K CET-2003 / JCECE-2003

Ans. (a) : The SER (Smooth Endoplasmic Reticulum) is involved in several process including lipid and carbohydrates synthesis steroid secreting cells are characterized by abundant smooth endoplasmic reticulum (SER) as well as metabolism of exogenous substances, such as drugs or toxins.

- Rough Endoplasmic Reticulum (RER) synthesis by protein and enzymes.
- Ribosome- provide site for protein synthesis.
- Lysosome contains digestive enzyme which cause autolysis.



5. Membrane that covers the vacuole in a plant cell is called

(a) tonoplast (b) tonoplasm
(c) jacket (d) cell membrane

UP CPMT-2012 / Punjab MET-2009
Rajasthan PMT-2009 / CMC Vellore-2009
AP EAMCET-1997 / Rajasthan PMT-2004, 1996
AMU-1998

Ans. (a) : Vacuole of a plant cell is covered with a membrane, called tonoplast.
The membrane of the Vacuoles is composed of phospholipids molecules and trans membrane proteins called Tonoplast.

6. Cell respiration is carried out by

(a) ribosome (b) mitochondria
(c) chloroplast (d) Golgi bodies
(e) None of these

CMC Vellore-2010 / AMU – 2009
WB JEE-2009 / Punjab MET - 2008
VMMC-2007 / Rajasthan PMT–2005, 2003, 1995
Punjab MET - 2004 / UP CPMT-2002
Manipal-2000

Ans. (b) : Cell respiration is carried out by mitochondria. Kreb's cycle occurs in mitochondrial matrix and ETS occurs in the inner membrane of mitochondria. Ribosome is known as protein factory. Chloroplast is site for photosynthesis. Main function of Golgi bodies is the packaging and secretion of proteins.

7. The site of protein synthesis is:

(a) smooth E.R (b) rough E.R
(c) plasmalemma (d) nucleus

JCECE-2006 / Haryana PMT-2006
BVP-2005 / Haryana PMT-2004
Manipal-2003 / DUMET-2001
Rajasthan PMT-1998

Ans. (b) : The site of protein synthesis in a cell is ribosomes. These ribosomes on the rough E.R. are involved in synthesizing proteins that are either destined for secretion, incorporation into the cell's plasma membrane, or transport to various organelles within the cell.

@apna_pdf

8. Rough endoplasmic reticulum differs from smooth walled endoplasmic reticulum due to the presence of:

(a) DNA (b) ribosome
(c) Ergastic substance (d) nucleus

DUMET-2011 / UP CPMT-2011
Uttarakhand-2005 / Punjab MET-1999

Ans. (b) : RER is frequently observed in the cells actively involved in protein synthesis and secretion. They are extensive and continuous with the outer membrane of the nucleus. The smooth endoplasmic reticulum is the major site for synthesis of lipid. In animal cells lipid-like steroidal hormones are synthesis SER.

9. Acrosome is formed by:

(a) mitochondria (b) golgi body
(c) ribosomes (d) lysosome

CG PMT - 2011 / Rajasthan PMT-2004
J&K CET-2003 / VMMC-2002

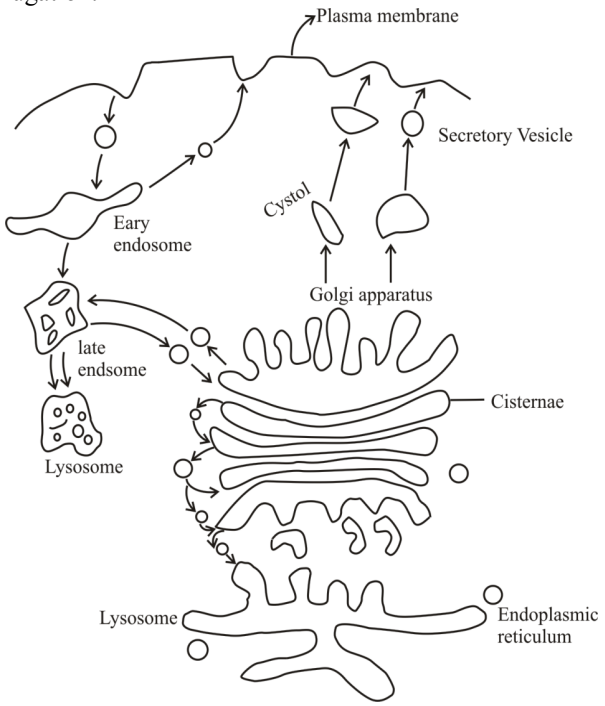
Ans. (b) : The acrosome is a membrane bound structure formed from the Golgi apparatus located most anteriorly in the head of the sperm. It is a cap like structure.

10. Which of the following is responsible for the origin of lysosome?

(a) Chloroplast (b) Mitochondria
(c) Golgi body (d) Ribosome

BVP-2009 / VMMC-2009
Uttarakhand PMT-2009
BHU-PMT (Screening)-2009

Ans. (c) : Golgi body is responsible for the origin of lysosome formation - The primary lysosomes are formed by golgi complex.
Lysosome discovered by de Duve in 1949. Biochemically in rat liver homogenate by ultracentri fugation.



11. The main function of lysosome is in

(a) only extracellular digestion
(b) only intracellular digestion
(c) Both [a] and [b]
(d) None of the above

AMU - 2005 / CG PMT-2005
Manipal-2004 / Uttarakhand PMT-2004

Ans. (c) : In the cell digestive enzymes are contained in Lysosomes. Lysosomes are involved in intra cellular digestion and are responsible for breakdown of parts of the cell and foreign particle in the cells.
Lysosomes function as the digestive system of the cell serving both to degrade material taken up from outside the cell and to digest absolute components of the cell itself.

12. Golgi body originates from

(a) lysosome (b) endoplasmic reticulum
(c) mitochondria (d) cell membrane

Karnataka CET-2018
VMMC-2007
Rajasthan PMT - 2005 , 1998
AFMC-2003

Ans. (b) : Golgi body originates from endoplasmic reticulum.

13. Which products of cell wear and tear get accumulated in lysosomes with age in the cell body of neuron?

(a) Lipofuscian granules (b) Histamine
(c) Bradykinin (d) Hemozoin

AP EAPCET-12.07.2022 Shift-I

Ans. (a) : Lipofuscian is a fluorochrome and may sensitize lysosomes to visible light a process potentially important for the pathogenesis of age-related macular degeneration. Lipofuscin is a fluorescent pigment that accumulates with age in the lysosomal compartment of post mitotic cell in several tissues such as neurons, heart and skeleton muscle. Life span is inversely correlated with rate of Lipofuscin accumulation in heart muscle.

14. Which of the following contains the enzyme lysozyme?

(a) Gastric juice (b) Bile juice
(c) Saliva (d) Pancreatic juice

TS EAMCET-30.07.2022 Shift-I

Ans. (c) : Lysozyme Enzyme found in the secretions (tears) to the lacrimal glands of animals and in nasal mucus gastric seretions and egg white. Saliva contains salivary amylase also contain lysozyme.

- Pancreatic juice consists of Alkaline Chief bicarbonate fluid and enzymes such as trypsin, lipase, and Amylase are essential for the digestion of most of the protein, fat and carbohydrate in the meal.
- Gastric juice are liquids found in the stomach.
- Bile juice secreted by liver does not contain any enzyme.

@apna_pdf

15. Match the following lists:

List-I		List-II	
(A)	Tonoplast	(I)	Modification of proteins
(B)	Stroma	(II)	Enzymes for catabolism
(C)	Cisternae of golgi apparatus	(III)	Connection between adjacent cells
(D)	Plasmodesmata	(IV)	Osmoregulation
		(V)	Enzymes for anabolism

The correct match is
Options:

	A	B	C	D
(a)	IV	V	I	III
(b)	IV	III	II	I
(c)	V	II	I	III
(d)	II	V	IV	I

TS EAMCET-30.07.2022 Shift-I

Ans. (a) : Tonoplast → The differentially permeable membrane that surrounds the vacuole. Cell sap is a non living content of vacuole. Turgar pressure is generated by the high osmotic pressure of the vacuole hence main function of tonoplast is osmoregulation

- Plasmodesma is the fibrillar plasma connecting through cell wall and briges Adjacent cells.
- Stroma → Each chloroplast is covered with a double membrane containing a protein across matrix called stroma.

Stroma is the ground substance of chloroplast and contains a small circular double helical DNA ribosomes and several enzymes.

- Cisternae of Golgi apparatus is modification of protein.

16. Assertion (A) : Endoplasmic reticulum divides the intercellular space into luminal and extraluminal compartments.
Reason (R): The tiny tubular structures scattered in the cytoplasm is responsible for this partition.
The correct option among the following is:
(a) (A) is true. (R) is true and (R) is the correct explanation for (A)
(b) (A) is true. (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-II

Ans. (a) : Endoplasmic reticulum divides the intercellular space into luminal and extraluminal compartment The ER is a network of membranous tubules within the cytoplasm of a eukaryotic cell, continuous with outer nuclear membrane.
The endoplasmic Reticulum is a network of tiny tubular structure scattered in the cytoplasm.

17. Identify the correct statements regarding chemiosmotic hypothesis:
(A) Splitting of the water molecule takes place on the inner side of the membrane.
(B) Protons accumulate within the lumen of the thylakoids.
(C) Primary acceptor of electron transfers the electrons to an electron carrier
(D) NADP reductase enzyme is located on the stroma side of the membrane
(E) Protons increase in number in stroma.
Choose the correct answer from the options given below:
(a) (A), (B) and (E)
(b) (A), (B) and (D)
(c) (B), (C) and (D)
(d) (B), (C) and (E)

NEET (Re-Exam)-04.09.2022

Ans. (b) : Chemiosmosis or Chemiosmotic theory is given by **Peter Mitchell** explains the synthesis of ATP in the chloroplast.

- During the process of photosynthesis, the synthesis of ATP causes proton gradient to develop due to the accumulation of protons in thylakoid lumen that are formed by splitting of water. As the electron moves through the photosystem, proton are transported across the membrane. Now NADP reductase (enzyme) in stroma along with the electron acceptor remove protons along with the reduction of NADPH + H^+.
- This cause proton gradient across the thylakoid membrane. The ATPase enzyme has a channel which allows the flow of proton through it and during this process the ATP is synthesised.

Protein increase in lumen of thylakoid.
Primary acceptor of electron transfer its electron to H^+ carrier. Pheophytin acts as the first electron carrier intermediate in the electron transfer pathway of PS-II.

18. Energy rich macromolecules are digested by the following cell organelle
(a) Mitochondrion
(b) Lysosome
(c) Endoplasmic Reticulum
(d) Golgi bodies

AP EAMCET-11.07.2022 Shift-II

Ans. (b) : Lysosome, is a single membrane bound structure found in nearly all type of eukaryotic cells and contains hydrolytic enzyme which is responsible for the digestion of macro-molecules, old cell part etc.
It is also called 'suicidal bag of cells'

19. Assertion (A) : In vacuole the concentration of ions and other material will be less than the cytoplasm.
Reason (R) : Tonoplast facilitates the transport of ions and other material against concentration to the vacuole.
The correct option among the following is
Options:
(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false

@apna_pdf

(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : (A) is false but (R) is true

The concentration of ions and other materials will be higher in the vacuole than in the cytoplasm. Because the vacuole is surrounded by a membrane called the tonoplast, which allows the transport ions and other materials into the vacuole against their concentration gradient. This means that the concentration of ions and other materials in the vacuole will be higher than in the cytoplasm.

Tonoplast is selectively permeable membrane which facilitates the transport of ions and other material against less than the cytoplasm.

20. The organelles that are included in the endomembrane system are

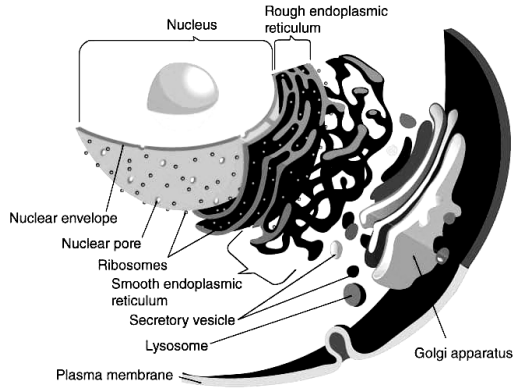
(a) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes
(b) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes
(c) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles
(d) Golgi complex, Mitochondria, Ribosomes and Lysosomes

NEET-2021

Ans. (c) : The system of membranous components whose functions are coordinated is called Endomembrane system. It consist of endoplasmic reticulum, Golgi complex, Vacuoles and lysosomes.

- Mitochondria is semi-autonomous cell organelle.
- Ribosome is non-membranous cell organelle.

ENDOMEMBRANE SYSTEM



21. The name endomembrane system to the membranous organelles because _____

(a) Their memberanes are attached
(b) Their functions are coordinated
(c) They have only interconnected membrane
(d) Their functions are not coordinated

AP EAMCET-05.10.2021 Shift-I

Ans. (b) : The name endomembrane system to the membranous organelles because their function are coordinated. The endomembrane system is a membranous component of the eukaryotic cell. The Endomembrane system include ER, golgi apparatus, lysosome and vacuole.

22. The middle lamella of cell wall is mainly composed of _____

(a) Pectin
(b) Calcium Carbonate
(c) Calcium Magnesium Pectate
(d) Lignin

AP EAMCET-25.09.2020 Shift-II
Haryana PMT-2006

Ans. (c) : The middle lamella of cell wall in mainly composed of calcium and magnesium pectate which helps in adhesing different neighbouring cells.

23. Phospholipids with phosphorylated organic compound in plasma membrane is

(a) Lecithin (b) Thymine
(c) Lysine (d) Glycolipid

AP EAMCET-25.09.2020 Shift-II

Ans. (a) : Phosphorus and a phosphorylated organic compound are found in some fatty acids. There are phospholipids found in cell membranes. Lecithin is an example of phospholipids.

24. The fluidity of membranes in a plant in cold weather may be maintained by

(a) Increasing the number of phospholipids with unsaturated hydrocarbon tails
(b) Increasing the proportion of integral proteins
(c) Increasing concentrations of cholesterol in membrane
(d) Increasing number of phospholipids with saturated hydrocarbon tails

AP EAMCET-25.09.2020 Shift-II

Ans. (a) : In colder conditions, the cell membrane's unsaturated fatty acid chains become more tightly packed. This compact arrangement causes the surrounding phospholipids molecules to be pushed away from one another. As a result, the cell membrane maintain its fluidity and flexibility, ensuring essential cellular processes can continue despite the lower temperature.

25. Lysosomes are A dense bodies, and originate from B

(a) A-single membrane bound, B-Golgi apparatus
(b) A-double membrane bound, B-Golgi apparatus
(c) A-double membrane bound, B-endoplasmic reticulum
(d) A-single membrane bound, B- nucleus

MHT CET-08.10.2020 Shift-I

Ans. (a) : Lysosome was discovered by de Duve in 1949 biochemically in rat liver homogenate by ultracentrifugation.

Single cell membrane organelle – vacuole, E.R, Golgi body, Lysosome.

Double membrane – mitochondria, nucleus, chloroplast.

Membrane-less cell organelle – Ribosome, centrosome.

26. Match the following:

(a)	**Protein**	**(i)**	**SER**
(b)	**Lipid**	**(ii)**	**Golgi body**
(c)	**Glycoprotein**	**(iii)**	**Lysosome**
(d)	**Hydrolytic enzyme**	**(iv)**	**RER**

@apna_pdf

(a) a – i, b – ii, c – iii, d – iv
(b) a – iv, b – ii, c – i, d – iii
(c) a – iv, b – i, c – ii, d – iii
(d) a – i, b – iii, c – ii, d – iv

AIIMS-26.05.2019 Shift-I

Ans. (c) :

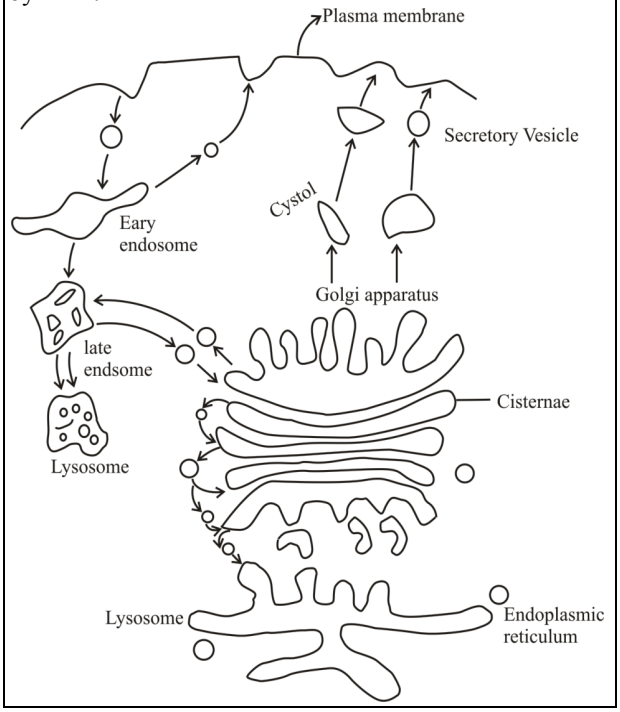
- Rough ER are attached with ribosomes and helps in protein synthesis.
- Smooth ER are not connected with ribosome and they are function as lipid formation, detoxification, various hormones and steroid formation.
- Golgi bodies function as a modification and synthesis of carbohydrate, which is a major part of Glycoproteins.
- Lysosomes contain hydrolytic enzyme helps in degrade various biomolecules.

27. Which of the following statements is not correct?

(a) The hydrolytic enzymes of lysosomes are active under acidic pH
(b) Lysosomes are membrane bound structures
(c) Lysosomes are formed by the process of packaging in the endoplasmic reticulum
(d) Lysosomes have numerous hydrolytic enzymes

NEET-2019

Ans. (c) : Lysosome are actually formed by budding off/from the trans fall of Golgi bodies. These membrane bound structure contain hydrolytic enzymes, which are active under acidic PH. The precursors are synthesized by RER.

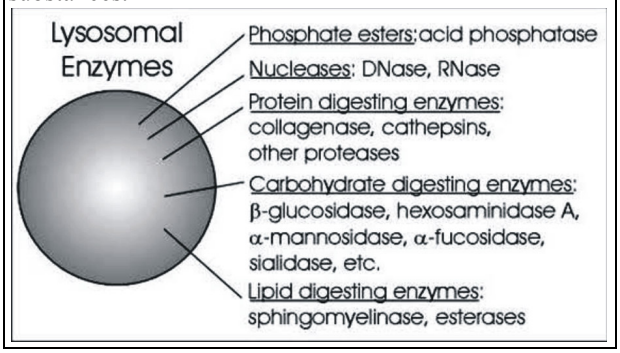


28. All the digestive enzymes like carbohydrase, protease, lipase, DNase, RNase are found in:

(a) Lysosome (b) peroxisome
(c) Glyoxysome (d) Vacuole

AIIMS-27.05.2018 Shift-II

Ans. (a) : Lysosomes are small vesicles like structure formed by Golgi apparatus. Lysosome contains/store hydrolytic enzymes (carbohydrase, protease, lipase, DNase, RNase etc). These enzymes are responsible for breaking down various hydrolytic biomolecules and these enzymes are also engulfed or digest the foreign substances.



29. Which of the following events does not occur in rough endoplasmic reticulum?

(a) Protein folding
(b) Protein glycosylation
(c) Phospholipids synthesis
(d) Cleavage of signal peptide

NEET-2018

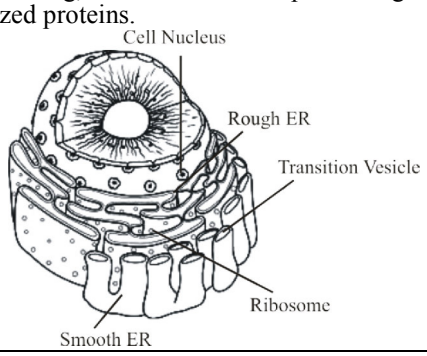
Ans. (c) : Phospholipids synthesis does not take place in rough endoplasmic reticulum.

The phospholipids synthesis occur in smooth endoplasmic reticulum. It can synthesis the lipid like cholesterol and phospholipids.

It also synthesis and secrete steroid hormones from cholesterol.

SER (Smooth endoplasmic reticulum) perform detoxification in liver.

RER involved in the synthesis of protein. Function of RER – folding, modification and processing of newly synthesized proteins.



30. Which of the following organelle is involved in xenobiotic detoxification?

(a) Golgi
(b) Lysosome
(c) SER
(d) RER

HP CET-2018

Ans. (c) : Smooth endoplasmic reticulum is involved in xenobiotic detoxification. It plays a vital role in the metabolism of various substances, including drug, pollutant and other xenobiotics (only foreign compounds).

@apna_pdf

31. Which of the following organelle is known a traffic police of the cell?
(a) Golgi body
(b) Mitochondria
(c) Endoplasmic reticulum
(d) Nucleus

HP CET-2018

Ans. (a) : Golgi bodies discovered by camillogolgi 1898 in the nerve cell of the out.
Up processing chemicals received by cisternae inters within and the median regions processing occurs as glycosidation i.e. formation of Golgi protein. Glycosylation is formation of glycolipid and sent to outside of the cell by the process exosytosis. Therefore called traffic police of the cell or principal director of macromolecular traffic in cell mitochondria.

32. Which one of the following is not included under endomembrane system?
(a) Endoplasmic reticulum
(b) Mitochondria
(c) Lysosome
(d) Vacuole

Karnataka CET-2017

Ans. (b) : Mitochondria help in oxidative phosphory lation and generation of ATP
Mitochondria, chloroplast and peroxisome are not the part of endomembrane system because the function are not coordinated with the same.
Endomembrane system includes the endoplasmic reticulum (ER), Golgi apparatus, Lysosomes and vacuole.

33. Vesicles of Smooth Endoplasmic Reticulum (SER) are most likely on their way to:
(a) plastids (b) lysosomes
(c) nucleous (d) Golgi apparatus

WB JEE-2006

Ans. (d) : The Golgi apparatus receives vesicles from the smooth E.R. the Golgi apparatus modifies contents of vesicles.

34. Golgi complex works for:
(a) excretion (b) respiration
(c) secretion (d) reduction

Rajasthan PMT-2004

Ans. (c) : Functions of Golgi apparatus:-
(i) secretion
(ii) Cell plate formation
(iii) Cell wall formation
(iv) Production of hormones
(v) formation of acrosome during spermatogenesis
(vi) Glycosidation of lipids and proteins.

35. Golgi complex is specialised for
(a) energy transduction
(b) glycosidation of lipids
(c) digestion
(d) conversion of energy

BVP-2010

Ans. (b) : The Golgi complex plays a major role in the glycosidation of lipids and proteins to produce glycolipids and glycoproteins.

36. Enzymes for autolysis are found in :
(a) nucleus (b) mitochondria
(c) chloroplast (d) lysosome

Rajasthan PMT-1996

Ans. (d) : Function of Lysosomes :-
(i) Intracellular digestion
(ii) Digestion of extracellular material
(iii) Autolysin :- In case of disease the lysosomes destroy the cells.
(iv) Trigger of cell division

37. The area where brown fats are maximum in infant neck will have more:
(a) Golgi bodies (b) Mitochondria
(c) Chromophill (d) Smooth E.R

Rajasthan PMT-1996

Ans. (b) : The area where brown fats are maximum in infant neck will have more mitochondria. Brown adipose tissue, also known as brown fat is known for generating heat in mammals, especially in infants. This heat generation is essential for maintaining body temperature in newborns.

38. E.R. is non-Continuous with:
(a) Nuclear membrane (b) Plasma lemma
(c) Golgibody (d) Mitochondria

Rajasthan PMT-1996

Ans. (d) : Endoplasmic Reticulum non- continuous with mitochondria due to different in structure and functions.

39. Endoplasmic reticulum was discovered by
(a) K. R.Porter (b) Robinson
(c) Brown (d) Moore

UP CPMT-2010

Ans. (a) : Endoplasmic reticulum was discovered by K.R porter in 1948.

40. Lysosomes are formed by
(a) endoplasmic reticulum (b) mitochondrion
(c) golgi membrane (d) both [a] and [c]

BVP-2008
Uttarakhand PMT-2007

Ans. (d) : Lysosomes are formed by endoplasmic reticulum + Golgi membrane.

41. Which of the following maintains continuity between the water and lipid phases inside and outside the cells ?
(a) Cell wall
(b) Lecithin
(c) Cell vacuole
(d) Cell membrane of woody plants

Manipal-2004

Ans. (b) : Lecithin maintains continuity between the water and lipid phases inside and outside the cells. Lecithin is also known as phosphotidyl-choline.

42. Endoplasmic reticulum occurs in the forms of (1) cistenae and vesicles (2) Tubules (3) Myeloid bodies (4) vacuoles
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011

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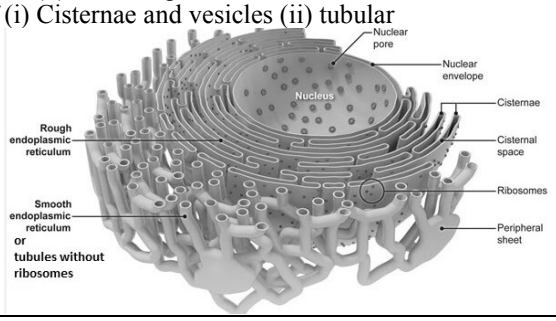
Ans. (b) : : Endoplasmic reticulum occurs in the forms of (i) Cisternae and vesicles (ii) tubular



43. Dictyosomes are also known as :
(a) ribosomes (b) golgi bodies
(c) lysosomes (d) mesosomes

BHU PMT-2001

Ans. (b) : Dictysome are also known as lipochondria or Golgi bodies.

44. Which of the following organelles provides cytoskeletal support to the cell?
(a) Golgi bodies (b) Endoplasmic reticulum
(c) Mitochondria (d) Peroxisomes

JIPMER-1998

Ans. (b) : Endoplasmic Reticulum provides cytoskeleton support to the cell.

45. Long flattened usually unbranched units arranged in parallel stacks in endoplasmic reticulum are called
(a) cisternae (b) cristae
(c) vesicles (d) tubules

J&K CET-2009
Rajasthan PMT-1998

Ans. (a) : Endoplasmic Reticulum composed of three parts–
(i) **Cisternae**:- Which are chief constituents of E.R. they occur in long flattened usually unbranched tubules arranged in parallel stocks in endoplasmic reticulum.
(ii) Vesicles:- large rounded spherical bodies of various sized.
(iii) Tubules:- Branched or un-branched small structure.
Functions:- (i) Mechanical support (ii) Intra-cellular circulation (iii) Protein – synthesis (iv) Lipid synthesis (v) Glycogen synthesis

46. Axoneme is a structure associated with
(a) golgi bodies
(b) only cilia
(c) only flagella
(d) Both cilia and flagella

J&K CET-2014

Ans. (d) : The axoneme is the axial filament made of microtubule forming the cilia and flagella. It consists of 9 periphere microtubule doublet and 2 central single microtubule pair. Axoneme acts as the skeleton of the organism that have cilia and flagella.

47. Cisternae have a diameter of
(a) 0.5 μm to 1.0 μm (b) 1.0 μm to 1.5 μm
(c) 1.5 μm to 2.0 μm (d) 2.0 μm to 2.5 μm

J&K CET-2014

Ans. (a) : Cisternae have a diameter of 0.5 μm to 1.0 μm. The diameter of cisternae in the Golgi apparatus can vary depending on the specific cell type, development stage and functional state.

48. Perinuclear space is present in
(a) cytoplasm
(b) nucleus
(c) ER(Endoplasmic Reticulum)
(d) Golgi apparatus

J&K CET-2014

Ans. (c) : Perinuclear space is present in E.R. It is a space present between nucleus and cytoplasm and separate them. It's act as a barrier for entering of any substance between the nucleus and cytoplasm.

49. Rough endoplasmic reticulum is actively involved in
(a) protein synthesis
(b) hormone synthesis
(c) lipid synthesis
(d) carbohydrate synthesis

J&K CET-2014

Ans. (a) : Rough endoplasmic reticulum is actively involved in protein synthesis because it contain ribosomes.

50. Lysosome along with the food content is called:
(a) primary lysosmoe
(b) secondary lysosome
(c) residual bodies
(d) cytosome

JIPMER-1997

Ans. (b) : Lysosomes are of four types-
(a) primary Lysosomes = storage granular:-
Produced from the Golgi bodies these are vesicles like structure. They contain one or another type of acid hydrolase enzyme.
(b) Secondary Lysosomes = heterophagosomes = digestive vacuole. These contain full complement of acid hydrolyses enzymes. These lysosomes are formed by the fusion of primary lysosome with the phagosome.
(c) Residual bodies = Tertiary lysosomes
Residual bodies are formed if digestion (inside the digestive vacuole) is incomplete.
(d) Autophagic vacuoles = autophagosome = Autolysosomes
They are formed by the fusion of a number of primary lysosomes around worn-out or degenerated and digested intercellular organelles.

51. Which of the following is responsible for the mechanical support, protein synthesis and enzyme transport?
(a) Endoplasmic reticulum (b) Mitochondria
(c) Cell membrane (d) Dictyosome

AIIMS-2007
VMMC-2002

Ans. (a) : The endoplasmic reticulum is responsible for the mechanical support, protein synthesis and enzyme transport in eukaryotic cells. ER provides structural support to the cell and maintain its shape.

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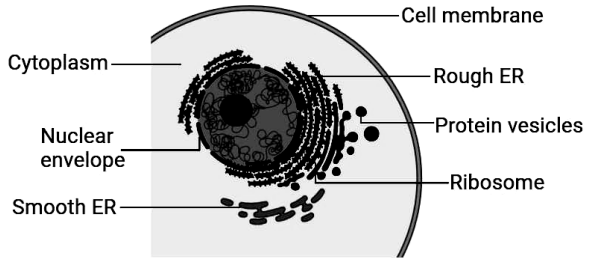
Rough endoplasmic reticulum (RER) contain ribosome (protein factory) are responsible for protein synthesis. Smooth endoplasmic reticulum (SER) helps in transport necessary enzymes for synthesis of lipids, detoxification of drug etc.



52. Lysozyme that is present in perspiration, saliva and tears, destroys
(a) certain fungi
(b) certain types of bacteria
(c) all viruses
(d) most virus-infected cells

JCECE - 2012
Rajasthan PMT-2010

Ans. (b) : Lysozyme that is present in perspiration, saliva and tears, destroys- certain types of bacteria

53. Protein packaging is done in
(a) Golgi apparatus (b) ribosomes
(c) ER (d) nucleolus

AMU-2011
DUMET - 2002

Ans. (a) : Functions of Golgi apparatus →
Glycosidation of lipids and protein – the golgi complex plays a major role in the glycosidation of lipid and proteins to produce glycolipids and glycoproteins.
→ Lysosomes originate from Golgi apparatus.

54. Golgi apparatus is absent in
(a) higher plant
(b) yeast
(c) bacteria and blue-green algae
(d) liver cells

AIPMT – 1993
BCECE-2014
BHU-PMT (Screening)-2008

Ans. (c) : The Golgi apparatus is absent in bacteria and cynobacteria because these organisms belong to a group of simple, single-celled organisms known as prokaryotes which lack membrane bound organelles.

55. Dictyosomes were discovered in 1989 by
(a) Robert Brown (b) Rudolf Virchow
(c) Robert Hooke (d) None of these

AMU-1999

Ans. (d) : Dictyosomes were discovered by Italian cytologist Camillo Golgi in 1898 for this, he was got nobel prize in 1906.
Robert Hook:- English botanist (1665)
(i) Coined the term cell
(ii) Discovered cell wall in cork cell.
Robert Brown:-
(i) Discovered nucleus
(ii) Discovered Brownian movement which is a colloidal property of protoplasm.
Rudolf Virchow :- Father of modern pathology.
(i) Gives famous statement about cell "Omnis cellula e cellula".
(ii) Virchow's Triad

56. The two cell organelles not enclosed by a membrane are
(a) chloroplast and mitochondria
(b) nucleus and nucleolus
(c) golgi apparatus and microbodies
(d) none of the above

AMU-1999

Ans. (d) : Single membrane bound organelle-vacuole, lysosome, golgi apparatus, E.R, micro bodies.
Double membrane bound organelle- nucleus, mitochondria, chloroplast.
Ribosomes, Cytoskeleton, Centrioles (in animal cells), nucleoid, nucleolus are the non-membrane bound cell organelles.

57. Lysosomes were discovered by de Duve accidently. Who gave the term lysosomes and examined under electron microscope?
(a) Fitz James (b) Novikoff
(c) Palade (d) Robertson

VMMC-2006

Ans. (b) : Lysosomes were discovered by Christian de Duve in 1955 but were named and observed under on electron microscope by Novikoff (1956).

58. When a lysosome fuses with a phagosome, it results in the formation of:
(a) Secondary lysosomes (b) Primary lysosome
(c) Autophagic vacuole (d) Residual body

Karnataka CET-2003

Ans. (a) : Secondry lysosomes = heterophagosomes = digestive vacuole :-
These contain full complement of acid hydrolyses enzymes these lysosomes are formed by the fusion of primary lysosome with the phagosome or pinosome.

59. Hurlers disease is caused by the absence of:
(a) mitochondria (b) lysosomes
(c) lomosomes (d) mesosomes

Uttarakhand-2005
BVP - 2000

Ans. (b) : Hurlers disease areas formerly known as gargoylism. It is an inherited lysosomal disorder caused by the absence of alpha-L-iduronidase an enzyme responsible for the degradation of glycosamino-glycans or muco-polysaccharides. It is genetic inherited disease which is inherited in autosomal recessive pattern.

60. Which of these may cause hypothermia in humans?
(a) Smoking (b) LSD
(c) Dopamine (d) Alcohol consumption

AMU-2005

Ans. (d) : Hypothermia is a medicinal condition in which body's temperature dangerously drop (35° C) and in prolonged cooler condition body is not able to produce enough heat for the maintaining essential physiological processes. This condition is occurs due to high consumption of alcohol, which dilate the blood.

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61. Constituents of plasma membrane are

(a) Protein-lipid-protein (b) Lipid-protein-lipid
(c) Protein-phosphorus (d) Lipid-sugar-protein

CG PMT-2006

Ans. (a) : Most plasma membranes consists of approximately 50% lipid and 50% protein by weight with the carbohydrate portions of glycolipids and glycoprotein's constituting 5 to 10 % of the membrane mass and helps in various intricate functions including cell signaling, transport, and maintain cell integrity.

62. Out of the given substances which one is present in abundance in lysosomes?

(a) Isomerase (b) Heme
(c) Acid phosphate (d) Cytochrome

Manipal-2006

Ans. (c) : Acid phosphate is present in abundance in lysosomes. Lysosomes are abundant in hydrolytic enzymes such as proteases, salfatiases, nucleases, lipases, phosphates, glycosidases and nucleaeases, all of which degrade complex macromoleculer. These enzymes are used for the controlling intracellular digestion of macromolecules. Lysosomal enzymes have optimal activity at PH = 5.

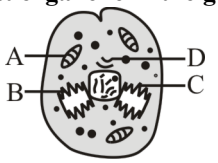
63. The chemical substances found most abundantly in the middle lamella are released into the phragmoplast by

(a) endoplasmic reticulum
(b) golgi complex
(c) spindle fragments
(d) interzonal fibres

Manipal-2009

Ans. (b) : The chemical substances found most abundantly in the middle lamella and released into the phragmoplast by golgi complex. It's helps in protein packaging. The Golgi complex synthesizes polysaccharides which bring about formation of a cell plate between daughter nuclei during cytokinesis.

64. The RER in the cell synthesized protein which would be later used in building the plasma membrane. But it is observed that the protein in the membrane is slightly different from the protein made in the RER. The protein was probably modified in another cell organelle. Identify that organelle in the given diagram.



(a) D (b) A
(c) B (d) C

Manipal-2009
Karnataka CET-2009

Ans. (a) : Protein synthesized by the rough endoplasmic reticulum and lipid synthesized by smooth endoplasmic reticulaum reach the cisternae of the golgi apparatus. Here they combine with carbohydrates to form glycoproteins and glycolipids. The Golgi apparatus or Golgi complex, functions as a factory in which protein received from the ER are further processed and sorted for transport.

65. Cells which are secretory in function have abundant :

(a) lysosomes (b) E.R.
(c) dictyosomes (d) osteosomes

DUMET-2001, 2002
Haryana PMT-2008

Ans. (c) : Dictyosome is a cup-shaped structure of flattened membranous vesicles found in plant cell. They modify protein from the ER, and may also polymerize sugars to polysaccharides. It ensures the transport of substances produced by the secretary cells to target areas. Therefore dictyosomes are secretary in function.

66. Protoplast lacks:

(a) cytoplasm (b) nucleus
(c) plasma membrane (d) cell wall

AP EAMCET-2002

Ans. (d) : Protoplasts are osmotic plant cells that lack cell walls. Plant cell-cell wall = protoplast.

67. RNA is not found in

(a) chromosome (b) plasmalemma
(c) nucleolus (d) ribosome

Haryana PMT-2008

Ans. (b) : RNA is not found in plasma lemma. Plasma lemma is also known as the plasma membrane. These are found inside the cell wall of a cell. These are made up of proteins, phospholipids, and carbohydrates and do not contains RNA.
The telomerase in chromosome contains RNA for the protection of chromosome from being cut. Ribosome and Nucleolus also contain protein and RNA.

68. In plant cell wall

(a) secondary wall is always present
(b) may be absent
(c) there cannot be intercellular spaces
(d) bear pores through which cytoplasm can pass

CG PMT-2011

Ans. (d) : Plant cell wall- bears pores through which cytoplasm can pass. It act as selective permeable membrane.

69. Assertion : Dope test is used to estimate the level of blood alcohol by analyzing the breath of persons drinking alcohol.
Reason : a drunken person usually feels tense and less talkative.

(A) Both A and R are true, R is correct explanation of A.
(B) Both A and R are true but, R is not correct explanation of A.
(C) A is true but, R is false.
(D) Both A and R are false.
(E) A is false but R is true

(a) A (b) B
(c) C (d) D
(e) E

HP CET-2012

Ans. (d) : A dope test in a test to determine whether an athlete is taking drugs to enhance one's performance.
A breathalyzer is a device for estimating blood alcohol content by analyzing the breath of a person is drink, in the initial stages the nervous system is stimulated, and the person becomes hyperactive and talks more.

@apna_pdf

70. Protein synthesis takes place in
(a) ribosomes (b) chloroplasts
(c) mitochondria (d) Golgi bodies
BHU-PMT (Screening)-2008
AIIMS-2000

Ans. (a) : Protein synthesis takes place in ribosomes.

71. The organelles, which take part in photo respiration are
(a) Chloroplast, mitochondria, nucleus
(b) Chloroplast, mitochondria, lysosome
(c) Mitochondria, chloroplast, peroxisome
(d) Mitochondria, lysosome, peroxisome
CMC Ludhiana-2008

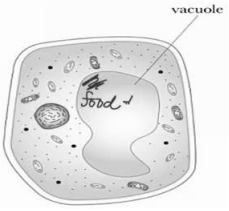
Ans. (c) : Photorespiration takes place → Mitochondria + chloroplast + peroxisome.

72. An interconnecting membranous network of the cell composed of vesicles flattened sacs and tubules is :
(a) Nucleus (b) Mitochondrion
(c) Endoplasmic reticulum (d) Lysosome
Karnataka CET-2012

Ans. (c) : The endplasmic reticulum (ER) is a network of membranous tubes and canals winding through the interior of the cell. It is a network of membranous tubules within the cytoplasm of a eukaryotic cell, continuous with the nuclear membrane. It has flattened sacs and tube-like structures also. It usually has ribosome attached and is involved in protein and lipid synthesis.

73. Vacuole in a plant cell:
(a) lacks membrane and contains air
(b) Lacks membrane and contains water and excretory substances
(c) is membrane-bound and contains storage proteins and lipids
(d) is membrane-bound and contains water and excretory substances
AIPMT-2008

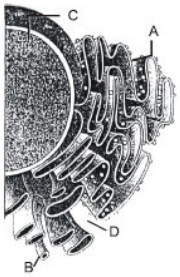
Ans. (d) : Vacuoles are membrane bound organelles present in cells. The membrane of the Vacuoles is composed of phospholipids molecules and trans membrane proteins called Tonoplast.
Functions of vacuoles –
- **Maintains the turgidity** of the cell.
- Helps to isolate substances that are harmful.
- Contains water that helps to keep the plant cell rigid.
- **Maintains the acidity of the cell cytoplasm** and creates an effective environment for proteins to act.
- Take part in storage vacuole contain water, minerals, enzyme and excretory waste.



74. Which one of the following group of cell organelles lack its own DNA?
(a) Nucleus and chloroplast
(b) Lysosome and dictyosomes
(c) Mitochondria and chloroplast
(d) Nucleus and mitochondria
UP CPMT-2014

Ans. (b): Lysomoes, single membrane and dictyosomes, well known as Golgi apparatus are devoid of its own DNA molecules.
While chloroplast Nucleus and mitochondria possess their own DNA. Mitochondria and chloroplast are called as semi autonomous cell organelles.

75. Identify the components labelled A, B, C and D in the diagram below from the list (i) to (viii) given with



(i) Cristae of mitochondria
(ii) Inner membrane of mitochondria
(iii) Cytoplasm
(iv) Smooth endoplasmic reticulum
(v) Rough endoplasmic reticulum
(vi) Mitochondrial matrix
(vii) Cell vacuole
(viii) Nucleus

The correct components are

	A	B	C	D
(a)	(v)	(i)	(iii)	(ii)
(b)	(v)	(iv)	(viii)	(iii)
(c)	(i)	(iv)	(viii)	(vi)
(d)	(vi)	(v)	(iv)	(vii)

AIPMT (Mains)-2010

Ans. (b) :
A - Rough endoplasmic reticulum- The RER, studded with millions of membrane bound ribosomes, is involved with the production, folding, quality control and dispatch of some proteins.
B- Smooth endoplasmic reticulum- The SER function in many metabolic processes. It synthesizes lipids, phospholipids in plasma membranes.
C- Nucleus- The primary functions of the nucleus are the store the cell's DNA, maintain its integrity, and facilitate its transcription & replication.
D- Cytoplasm- The cytoplasm is responsible for holding the components of the cell and protects them from damage. It stores the molecules required for cellular processes and is also responsible for giving the cell its shape.

76. Which cell organelle is concerned with glycosylation of protein:
(a) Ribosome (b) Peroxisome
(c) Endoplasmic reticulum (d) Mitochondria
AIPMT-2000

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Ans. (c) : Endoplasmic reticulum bears enzymes in the region of pores for modifying polypeptides synthesized by attached ribosomes, e.g. **glycosylation.**

- **Peroxisomes** are organelles that sequester diverse oxidative reactions and play important roles in metabolism, reactive oxygen species detoxification and signaling.
- **Ribosome** is an intercellular structure made of both RNA and protein and it is the site of protein synthesis in the cell.
- **Mitochondria** are membrane-bound cell organelles that generate most of the chemical energy needed to power the cell's biochemical reactions.

77. Important site for formation of glycoproteins and glycolipids is

(a) Lysosome (b) Vacuole
(c) Golgi apparatus (d) Plastid

AIPMT (Screening)-2011

Ans. (c) : Golgi bodies are cell organelles found in Eukaryotic cells. The newly synthesized proteins are handed over to the Golgi apparatus which is catalyzed by the addition of carbohydrates, lipid or sulphates moieties to the protein. Golgi apparatus is the important site of formation of glycoproteins and glycolipids.

78. Peptide synthesis inside a cell takes place in :

(a) Ribosomes (b) Chloroplast
(c) Mitochondria (d) Chromoplast

AIPMT (Screening)-2011

Ans. (a) : Peptide synthesis inside of a cell take place in Ribosome. Ribosomes are found in all cells and are involved in protein synthesis. The major constituents of ribosomes are RNA & proteins present in approximately equal amounts. Protein or peptide synthesis is carried out with an mRNA templete.

79. Read the following statements and identify the correct options given.

I. Sap vacuoles – Contain digestive enzymes with the help of which nutrients are digested
II. Contractile vacuoles – Take part in osmoregulation and excretion
III. Food vacuoles – Store and concentrate mineral salts as well as nutrients
IV. Air vacuoles – Store metabolic gases and help in buoyancy of cells

(a) I and II are correct (b) I and III are correct
(c) I and IV are correct (d) II and IV are correct

Kerala PMT-2008
AP EAMCET-2011

Ans. (d) : Contractile vacuoles–Take part in osmoregulation and excretion.

Air vacuoles – Store metabolic gases and help in buoyancy of cells.

- A sap vacuole are large, fluid filled that function as storage of various substances, primarily water, minerals and nutrients.
- Food vacuoles are contain digestive enzymes with the help of which nutrients are digested.

80. Difference between rough and smooth endoplasmic reticulum

(a) Rough has ribosomes
(b) Smooth has ribosomes
(c) Smooth takes part in protein synthesis
(d) Both has F_1 Particles

UP CPMT-2010, 2006

Ans. (a): On rough endoplasmic reticulum the ribosome are attached to the surface by ribophorin-I and ribophorin II. The ribosomes are meant for protein synthesis smooth endoplasmic reticulum lack ribosome and take take part in synthesis of lipid. The F_1 particles are found in the crystae (inner membrane) of mitochondria. The F_1 particles has ATPase activity.

81. Golgi body originates from

(a) Lysosome (b) Endoplasmic reticulum
(c) Mitochondria (d) Cell membrane

UPCPMT-2002

Ans. (b): The formation of Golgi bodies starts with assembly of flattened membrane sacs (cisternae), which are derived from the ER. These membrane sacs stack together to form distinctive structure of the Golgi apparatus. So the Golgi bodies originate from the endoplasmic reticulum during the process of cell organelle formation.

82. Which of the following is responsible for mechanical support and enzyme transport?

(a) Dictyosome (b) Cell membrane
(c) E.R. (d) Mitochondria

J&K CET-2001
AIIMS-1999

Ans. (c) : The endoplasmic reticulum is responsible for both mechanical support and enzyme transport within the cell. The extensive network of membrane provides mechanical support. RER is responsible for protein synthesis. SER is responsible for lipid synthesis.

83. Which of the following statements is true for lysosome?

(a) Suicidal bag
(b) Stain for acid phosphatase
(c) Some cystolic protin contains signals directing them to lysosome
(d) All of the above

CMC Vellore-2013

Ans. (d) : Lysosome discovered by Belgians scientist De. Duve 1949 in liver cell early called Pericanolicular bodies but in 1955 use the term lysosome. If the cell gets damaged, then one of the lysosomes bursts and releases some digestive enzymes and digest their own cell and ultimately the cell dies. Hence lysosomes are called suicides bag of the cell.

Lysomes are called suicidal bages because of their hydrolytic activity. Lysosome contain lysosomal acid phosphatase enzymes. Lysosomal enzymes are capable of breaking down all type of biological polymers.

84. Which of the following cell organelle remains enveloped by a single unit membrane?

(a) Mitochondria (b) Lysosomes
(c) Nucleus (d) Chloroplast

BVP-2003

@apna_pdf

Ans. (b) : Lysosome, Golgi body, E.R is a single membrane organelle.
Mitochondria chloroplast is double membrane organelle.
Ribosome and centrosome is membrane less organelle.

85. The endoskeleton of cell is made up of:
(a) Deutoplasm (b) Protoplasm
(c) Endoplasmic reticulum (d) Cell wall

BVP-2004

Ans. (c) : Endoskeleton is also refer as cytoskeleton of cell.
The endoskeleton of cell is made up of endoplasmic reticulum which forms basic framework of the cell. Porter and Thompson discovered the endoplasmic reticulum in 1945.

86. In plants vacuole contains:
(a) soil
(b) water and dissolved substance
(c) cytoplasm
(d) all of the above

Haryana PMT-2004
Manipal-2003
BVP-2005

Ans. (b) : The vacuole contain water and dissolved substance, as salt, minerals, nutrients, proteins & pigments. The differentially permeable membrane that surrounds the vacuole is called tonoplast. Cytoplasm is the fluid substance inside of a cell. The cytosol is the watery portion of the cytoplasm that all organelles float in.

87. The cell organelle associated with intracellular digestion of macromolecules is
(a) Lysosome (b) Peroxisome
(c) Polysome (d) Dictyosome
(e) Glyoxysome

Kerala PMT-2009

Ans. (a) : Cell organelle connected with intra cellular digestion of macro-molecules is Lysosomes. Lysosome contain/store hydrolytic enzymes. These enzymes are responsible for breaking down various biomolecules and these enzymes are also engulfed and digest foreign substance. This process is called autolysis.

88. Match the following lists

(A) Golgi apparatus	**(I) Conversion of lipids to carbohydrates**
(B) Glyoxysomes	**(II) Catabolism of long chain fatty acids**
(C) Peroxisomes	**(III) Formation of glycoproteins and glycolipids**
(D) Endoplasmic reticulum	**(IV) Osmoregulation**
	(V) Synthesis of lipids

	(A)	**(B)**	**(C)**	**(D)**
(a)	(II)	(III)	(V)	(I)
(b)	(IV)	(V)	(I)	(II)
(c)	(V)	(IV)	(II)	(III)
(d)	(III)	(I)	(II)	(V)

AP EAMCET-2014

Ans. (d) : Golgi apparatus – formation of glycoprotein's and glycolipids
Glyoxysomes is conversion of lipids to carbohydrates peroxisomes is catabolism of long chain fatty-acids.
ER synthesis the lipids.

89. Endoplasmic reticulum is in continuation with
(a) Golgi body (b) nuclear wall
(c) mitochondria (d) cell wall

JIPMER-2010

Ans. (b) : The endoplasmic reticulum is in continuation with nuclear wall. Specially, the rough ER is physically connected to the outer membrane of the nuclear envelope, and ribosomes or its surface and involved in protein synthesis. On the other hand, the smooth ER, is not directly connected to the nuclear envelope.

90. Select the correct matching in the following pairs:
(a) Smooth ER - Synthesis of lipids
(b) Rough ER - Synthesis of glycogen
(c) Rough ER - Oxidation of fatty acids
(d) Smooth ER - Oxidation of phospholipids

AIPMT-2015
MGIMS Wardha-2014

Ans. (a) : Smooth Endoplasmic Reticulum (SER) is a system of smooth membrane (membrane not having ribosome) within the cytoplasm of plant and animal cell. It is the site of important metabolic reaction. It also includes phospholipid and fatty acid synthesis.
In animal cell, lipid-like steroidal hormone are also synthesized by smooth endoplasmic reticulum.
Function of RER-protein synthesis.
Synthesis of glycogen takes place in SER.
Oxidation of fatty acids are take place in peroxisome and mitochondria

91. Nuclear envelope is a derivative of :-
(a) Membrane of Golgi Complex
(b) Microtubules
(c) Rough endoplasmic reticulum
(d) Smooth endoplasmic reticulum

AIPMT-2015

Ans. (c) : The nuclear envelope is a derivative of the endoplasmic reticulum, as it produced by rough endoplasmic reticulum, (RER) in telophase. The nuclear envelope, also known as the **nuclear membrane** is found surrounding the genetic material and nucleolus in eukaryotic cell. Nuclear envelope is a highly regulated membrane barrier that separates the nucleus from the cytoplasm in eukaryotic cell.

92. The osmotic expansion of a cell kept in water is chiefly regulated by:
(a) Mitochondria (b) Vacuoles
(c) Plastids (d) Ribosomes

AIPMT-2014

Ans. (b) : Vacuoles are non-cytoplasmic areas present inside cytoplasm. They are believed to be formed by expansion and pinching off from ER. There occurs a large central vacuole and some small vacuoles in plant cells. They play a major role in osmotic expansion of cell.

@apna_pdf

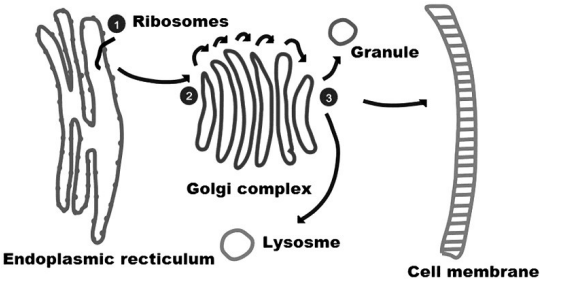
93. The main organelle involved in modification and routing of newly synthesized proteins to their destinations is –

(a) Endoplasmic Reticulum
(b) Lysosome
(c) Mitochondria
(d) Chloroplast

JIPMER-2007
AIPMT-2005

Ans. (a) : The main organelles involved in modification and routing of newly synthesized protein to their destination is endoplasmic reticulum.

- Inside the ER, the protein modification is occurs, such as folding into its proper shape and adding specific chemical tags like sugars. ER packed and transport the modified protein into transport vesicles, these vesicles transport the protein to its specific destination.



94

(a) On ribosomes presents in cytoplasm as well as in mitochondria
(b) On ribosomes present in the nucleolus as well as in cytoplasm
(c) Only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
(d) Only on the ribosomes present in cytosol

AIPMT-2005

Ans. (a) : Ribosome are the organelles, present in the cytoplasm, composed by rRNA and a set of specific protein. The synthesis of protein occur in cytoplasm as well as mitochondria. In an eukaryotic cell ribosome are present in cytoplasm or mitochondria and chloroplast, so, in these places protein synthesis occur.

- Protein biosynthesis is a core biological process occurring inside cells balancing the loss of cellular protein through the production of new protein.

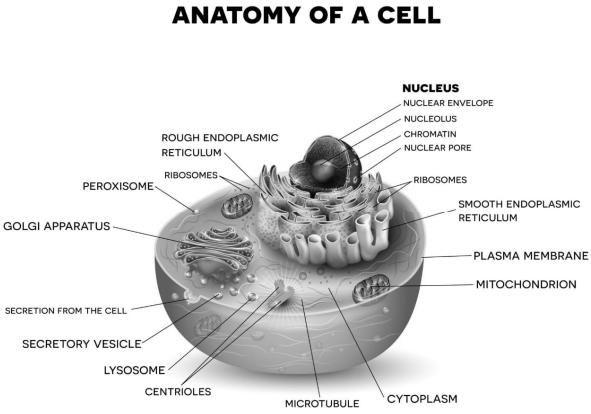
95. Which one of the following structures is an organelle within an organelle

(a) ER (b) Mesosome
(c) Ribosome (d) Peroxisome

AIPMT (Mains)-2012

Ans. (c) : The ribosome are the cell organelle that is present inside the other cell organelles like endoplasmic reticulum mitochondria and chloroplast. They are known as an organelle within an organelle.

- Ribosome are a organelle in a cell where protein synthesis occurs and it is composed of both RNA and protein.
- They manufacture amino acids and are present side other cell organelles like mitochondria, chloroplast and E.R.

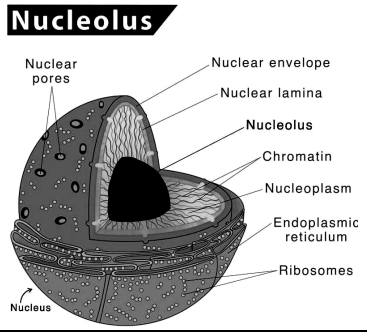


96. Ribosomes are produced in :

(a) Nucleolus (b) Cytoplasm
(c) Mitochondria (d) Golgibody

AIPMT-2002

Ans. (a) : A portion of the cell's nucleus called the nucleolus where ribosomes are made. The two primary components of ribosomes are ribosomal RNA (rRNA) and ribosomal protein are synthesized within the nucleolus. These two ribosomal parts combines to each other and create functional ribosomes.



97. Acrosome is formed by :

(a) nucleus (b) Golgi apparatus
(c) mitochondria (d) none of these

JIPMER-2006

Ans. (b) : Acrosome present in the spermatozoa is derived from Golgi bodies. Contain digestive enzyme as- hyaluronidase and acrosin that help in piercing the ovum. Acrosome derived from secretory vesicle of golgi body.

- Mitochondria - Benda (1898) stained these organelles with crystal violet and renamed them mitochondria.
- Robert brown discovered the nucleus in 1831. It is the center of the cell, it has genetic information and perform a vital role for cell.

98. Three of the following statements regarding cell organelles are correct while one is wrong. Which one is wrong?

(a) Lysosomes are double membraned vesicles budded off from Golgi apparatus and contain digestive enzymes.
(b) Endoplasmic reticulum consists of a network of membranous tubules and helps in transport, synthesis and secretion.

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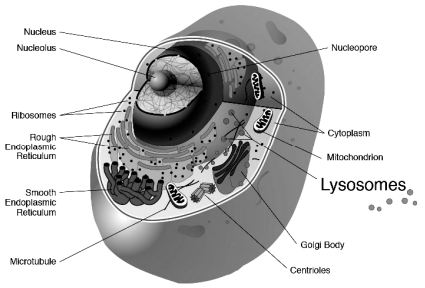
(c) Leucoplasts are bound by two membranes, lack pigment but contain their own DNA and protein synthesizing machinery.
(d) Sphaerosomes are single membrane bound and are associated with synthesis and storage of lipids.

AIIMS-2005

Ans. (a) : Lysosomes budded off or formed from the Golgi apparatus and contain digestive enzymes, but they are enclosed by single membrane. Lysosomes are small vesicles like structure which functions as degradation of several biomolecules. It contain hydrolytic enzyme.



99. Which of the following is related to glycosylation of protein?
(a) Lysosome
(b) Mitochondria
(c) Peroxisome
(d) Rough endoplasmic reticulum.

AIIMS-2002

Ans. (d) : Rough ER is related to Glycosylation of protein or addition of sugar moleculeS.
Two types of Glycosylation held by ER.
• N-linked Glycosylation – The Endoplasmic reticulum carefully attaches sugar molecules to certain or specific parts of the protein. This process helps the protein fold correctly and work properly.
• O-linked Glycosylation – In this addition of sugar is not specific, sugar are added on different proteins.

100. Which one is apparato reticolare?
(a) Golgi apparatus
(b) Endoplasmic reticulum
(c) Microfilaments
(d) Microtubules

AIPMT-1992

Ans. (a) : Apparato reticolare interno is a an anatomical term in Italian language, which mean "internal reticular apparatus. It refers to a part of the brainstem known as the reticular formation, a complex network of nerve cells (nervous) that play a important role in regulating various functions, such as consciousness, sleep, arousal, and attention.

101. Besides giving out secretory vesicles, the Golgi apparatus is also concerned with the formation of:
(a) Lysosomes
(b) Plastids
(c) Grana of chloroplasts
(d) Cell plates after cell division in plants

AIPMT-1994

Ans. (a) : Endoplasmic reticulum and Golgi body are involved in the formation of lysosomes. Enzymes of the lysosomes are synthesized in the rough endoplasmic reticulum. Golgi apparatus is also involved in the synthesis of cell wall, plasma membrane and lysosome. Golgi apparatus gives rise to primary lysosome by budding from trans face of cisternae. Golgi apparatus is also involved in synthesis of cellulose, hemicelluloses and lipid transport.

102. Which one of the following organelles is located near the nucleus and contains a collection of flattened membrane bound cisternae?
(a) Nucleolus (b) Mitochondrion
(c) Centriole (d) Golgi apparatus

AIPMT-1994

Ans. (d) : Golgi apparatus is an organelle found in all plant and animal cells. But absent in PPLO, Bacteria, blue green algae, mature RBC, It consists of flattened disc- like structures called cisternae located close the endoplasmic reticulum. The Golgi apparatus is responsible for transporting modifying and packaging proteins and lipids and for delivered to targeted destinations.

103. Golgi apparatus is found in:
(a) prokaryotic cell
(b) eukaryotic cell
(c) male gametes of bryophytes
(d) near mitochondria

J&K CET-2000

Ans. (b) : Golgi complex is found in all Eukaryotic cells except RBCs (Mature).
• The first electron microscope studies on the structure of Golgi complex have been done by Dalton and Felix (1954) in the epididymis of the Rat.

104. Mechanical support, enzyme circulation, protein synthesis and detoxification of drugs are function of
(a) ER (b) ribosomes
(c) dictyosomes (d) chloroplast

JCECE-2007

Ans. (a) : Mechanical support enzyme circulation protein synthesis and detoxification of drugs are function of ER.
- Dictyosomes → Golgy complex of plants is usually called as dictyosomes.
- Ribosomes → was discovered by palade in 1955 and the term Ribosome, has been introduced by Roberts in 1958 which is membrane less organelle.
- Chloroplast is a photosynthetic region in plant cell.

105. Enzymes found attached to inner membrane of mitochondria instead of matrix is/are
(a) succinic dehydrogenase
(b) cytochrome oxidase
(c) both (a) and (b)
(d) malic dehydrogenase

JCECE-2007

Ans. (c) : The end product of glycolysis is pyruvic acid which enters mitochondria and takes part in Krebs cycle in the mitochondria matrix. Within the cell the site of respiration or oxidative phosporylation is mitochondria. Enzymes found attached to inner membrane of

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mitochondria instead of matrix are succinic dehydrogenate and cytochrome oxidase. SDH is placed in the inner mitochondrial membrane because it has an immensely important role of catalyst in both citric acid cycle and in ETS. In citric acid cycle, SDH helps in catalyzing succinate into fumarate. It is also included in complex II of electron transport chain, linking citric acid cycle with electron transport chain.

106. Choose the incorrect match:

(a) nucleus-RNA
(b) lysosome-protein synthesis
(c) mitochondria-respiration
(d) cytoskeleton-microtubules

JCECE-2006

Ans. (b) : Lysosome was discovered by de-Duve in 1949 biologically in Rat liver homogenate by ultracentrifugation. De Duve (1963) also coined the name suicidal bag to lysosomes as they contain hydrolytic enzymes.
Lysosomes are covered by one lipoprotein unit membrane (double membranes are absent).
Protein synthesis is occurs by rough ER.

107. Which is not true about sphaerosomes ?

(a) Arise from ER
(b) Related to fat
(c) Single membrane bound structure
(d) Involved in photorespiration

Punjab MET-2008

Ans. (d) : Sphaerosomes were discovered by Hanstein in 1880 who called them as microsomes.
• Sphaerosomes are associated with synthesis and storage of lipids. Sphaerosomes in plant cell may also possess lysosomal activity sphaerosomes develop from the ER and contain about 40% fat so they have affinity for fat stain. Sphaerosomes are plant cell organelles that are involved in lipid synthesis and storage. Sphaerosomes are micro-organelles, single membrane bound also known as lipid droplets and oleosomes.

108. Consider the following statements and choose the correct option :

(A) The endomembrane system includes plasma membrane, ER, golgi complex, lysosomes and vacuoles.
(B) ER helps in the transport of substances, synthesis of proteins, lipoproteins and glycogen.
(C) Ribosomes are involved in protein synthesis.
(D) Mitochondria help in oxidative phosphorylation and generation of ATP.

(a) B, C and d are correct (b) A – alone is correct
(c) B – alone is correct (d) C – alone is correct
(e) D – alone is correct

Kerala PMT-2011

Ans. (a) : Endomembrane system includes ER, Golgi complex, lysosomes and vacuole because their functions are coordinated. ER helps in the transport of substances, synthesis of proteins, lipoproteins and glycogen,
Ribosomes are involved in protein synthesis,
Mitochondria help in oxidative phosphorylation and generation of ATP.

109. Cisternae are a part of:

(a) golgi apparatus (b) mitochondria
(c) chloroplasts (d) none of these

JIPMER-1996

Ans. (a) : The Golgi apparatus also called Golgi complex or Golgi body is a membrane bound organelle found in Eukaryotic cells (cells with clearly defined nuclei) that is made up of a series of flattened staked pouches called cisternae.
• Chloroplast was coined by A.J.W. Schrimper in 1883. In the higher plants there are 20 to 40 chloroplast per cell, chloroplast covered with a double membrane containing a proteinaceous matrix called stroma
• Benda in 1898 stained these organelles with crystal violet and renamed the mitochondria. Mitochondria is also known as power-house of the cell.

110. Which organelle of plant secretes polysaccharide and protein to make cell walls?

(a) Golgi bodies (b) Lysosome
(c) Mitochondria (d) Chloroplast

CG PMT-2005

Ans. (a) : Golgi mediated synthesis and secretion of matrix polysaccharides of the primary cell wall of higher plants. The Golgi apparatus of Eukaryotic cells is known for its central role in the processing sorting and transport of proteins to intra and extra cellular compartments.
• Lysosomes shows Autolysis.
• Mitochondria is known as power house of cell.
Chloroplast also called kitchen of cell it contain chlorophyll pigment which is the key component of photosynthesis.

111. These can be surrounded by a single layer membrane:

(a) Sulfur granules
(b) Glycogen granules
(c) Phosphate granules
(d) Cyanophycean granules

BCECE-2015

Ans. (a) : Sulphur granules are the cell organelle which is bounded with single unit layer membrane. Bacterial cell organelles are also single non-unit layer membraned bound.
• Glycogen granules or glycosome is considered as an independent metabolic unit composed of a highly branched polysaccharide and various proteins involved in its metabolism.
• Phosphate granules (Acidocalcisomes) polyphosphate granules or acidocalcisomes are membrane-bounded organelles that are conserved from bacteria to higher organism and whose main function is the Accumulation of poly p and cation.
• Cyanophycean granules are composed of various compounds, such as polysaccharides or polyphosphates, and they serve as storage sites for energy or phosphorous within the cells.

112. The surface of the Endoplasmic Reticulum (ER) is covered with :

(a) ribosome (b) DNA
(c) RNA (d) glucose

J&K CET-2005

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Ans. (a) : The surface of the endoplasmic reticulum (ER) is covered with ribosomes.
Ribosomes attached on the surface of endoplasmic reticulum by two glycol protein (1) Ribophorin molecular weight 65000 Dalton.
(2) Ribophorin II molecular weight 64000 Dalton large sub unit 60 'S'of the 80 'S'. Ribosome attached on the surface of endoplasmic reticulum on the basis of presence or absent of ribosome ER are two types.
(1) Rough ER and (2) Smooth ER. The surface of ER covered with ribosome that kind of ER is called rough endoplasmic reticulum. RER is present about 2/3 part of ER out remaining 1/3 part of ER ribosome is not found on the surface so it is called smooth endoplasmic reticulum.

113. Endoplasmic reticulum is studied with :
(a) ribosomes (b) lysosomes
(c) glyoxisomes (d) microsomes

DUMET-2002

Ans. (d) : Endoplasmic reticulum is studied with microsomes. Microsomes consist of heterogeneous collection of similar sized vesicles formed from endoplasmic reticulum and Golgi complex.
Microsomal fraction is isolated by differential centrifugation after the nucleus and mitochondrial fraction. Microsomes are related to ER. It is not found in intact cells.

114. The Golgi apparatus
(a) is found only in animals
(b) is found in prokaryotes
(c) is a site of rapid ATP production
(d) modifies and packages proteins

DUMET-2011

Ans. (d) : The Golgi apparatus modifies and packages protein. Golgi body also called a Golgi apparatus is a cell organelle that helps in process and package proteins and lipid molecules especially protein destined to be exported from the cell.
Dictyosomes serve as temporary storage place for proteins and other compounds synthesized by ER.
Glycosylation with the enzymes glycosyltransferase characteristic of Golgi complex proteins and lipid are glycosidated to form glycoprotein and glycolipids.

115. Cell organelle responsible for autolysis:
(a) distyosome (b) lysosome
(c) peroxisome (d) glyoxysome

DUMET-2003

Ans. (b) : Cell organelle responsible for autolysis in lysosomes.
Autolysis is related to lysosomes and when a cell dies the lysosomes membrane breaks and the enzymes are released resulting in the digestion of cellular materials.
- Two types of microbodies related to lysosomes are peroxisomes and glyoxysomes.
- Golgi complex of plants is usually called dictyosomes the turn dictyosomes was coined by perroncito 1910.

116. The principal function of Golgi apparatus is
(a) producing enzymes
(b) protein synthesis
(c) synthesis of lipids
(d) packaging materials

AMU-2014

Ans. (d) : The principle function of Golgi apparatus is the packaging and secretion of protein.
Function of golgi complex.
(1) Secretion
(2) Storage
(3) Glycosylation
(4) Cell wall formation
(5) Acrosome formation
(6) Plasma membrane formation
(7) Lysosome formation.

117. Golgi apparatus is specialised for
(a) energy transduction
(b) digestion of protein
(c) glycosidation of proteins and lipids
(d) digestion of carbohydrates

J&K CET-2013

Ans. (c) : Golgi apparatus is specialized for-
glycosidation of proteins and lipid
Glycosidation is the process of forming a glycosidic containing a glycosidic bond, protein and lipids are glycosidation to form glycoprotein and glycolipid.

118. Which of the following is not the function of 'golgi body ?
(a) Protein synthesis
(b) Formation of cell wall
(c) Formation of fatty acids
(d) Formation of plasma membrane

Rajasthan PMT-1999

Ans. (a) : Protein synthesis is not the function of Golgi body. Protein synthesis is take place in Ribosome.
The Golgi apparatus is an essential organelle found in eukaryotic cells, and it play a vital role in the processing, packaging, distribution of protein and lipids in the cell.
Function of golgi body - (1) Secretion, (2) Storage, (3) Glycosylation, (4) Cell wall formation, (5) Acrosome formation, (6) Plasma membrane formation, (7) Lysosome formation

119. Endoplasmic reticulum is absent in which ?
(a) Monocytes of Human
(b) WBC of Human
(c) Embryonic cells
(d) RBC of mammals

Rajasthan PMT-1999

Ans. (d) : Endoplasmic reticulum is absent in RBC of mammals. ER was discovered by porter in 1945.
ER consist of a complex membrane system in the cytoplasm of eukaryotic cells.
ER is absent in Prokaryotic and mature erythrocytes of mammals.

120. Golgi body is :
(a) organ for protein synthesis
(b) secretory organ
(c) both 'a' and 'b'
(d) none of these

Rajasthan PMT-1999

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Ans. (b) : Golgi body is secretory organ.
Secretion–The Golgi material is primarily associated with secretary activities of the cell.Golgi apparatus received proteins from ER and further processed and sorted for transport to their destination. Organelle of protein synthesis is ribosome.

121. Golgi bodies are absent in:
(a) RBC (b) Sieve tubes
(c) Prokaryotes (d) All of these
J&K CET-2001

Ans. (d) : Golgi body are absent in RBCs, Prokaryotes and sievetube.
Golgi complex is found in all Eukaryotic cells except RBCs.

122. Read the statements given below with regard to the functions performed by Golgi apparatus?
(A) Transport and chemically modify the materials contained within it
(B) Secrete mucin in the respiratory tract
(C) Secrete slime in the insectivorous plants which of the following is the correct answer?
(a) A is wrong but B and C correct
(b) B is wrong but A and C correct
(c) B and C wrong but A is correct
(d) All A, B and C are correct
J&K CET-2003

Ans. (d) : Option (d) All A, B and C are correct,
The Golgi apparatus is involved in transport modification, and secretion of various materials within the cell. It also play a role in the secretion of substances like mucin in the respiratory tract and slime in insectivorous plants.

123. Which of the following cellular organelles is/are bound by a single membrane? peroxisomes, lysosomes, mitochondria
(a) Only peroxisomes but not lysosomes and mitochondria
(b) Both peroxisomes and lysosomes but not mitochondria
(c) all of the three organelles
(d) None of the three organelles
J&K CET-2003

Ans. (b) : Lysosome, peroxisomes, Golgi bodies ER are a single membrane cell organelles.
- Mitochondria and chloroplast is a double membrane cell organelles.
- Ribosome and nucleoli is membrane-less cell organelle.

124. Which of the following is not present in cell vacuoles?
(a) Hydrolytic enzymes
(b) Latex of the rubber plant
(c) DNA
(d) Anthocyanins of the flowers
J&K CET-2003

Ans. (c) : DNA is not present in cell vacuoles. Cell vacuole contain water and dissolved substance (anthocyanin). Vacuoles serve as a temporary store house for many of the cells solutes and macromolecules. Including ions, sugar, amino acid, proteins and carbohydrates. Vacuole do not possess its own DNA.

125. Suicidal bags are
(a) lysosomes (b) golgi bodies
(c) ribosomes (d) chloroplast
Rajasthan PMT-2006, 2003

Ans. (a) : Suicidal bage are lysosome.
• De Duve in 1963 also coined the name suicide bags to lysosome as they contain hydrolytic enzymes.
Lysosome are covered by one lipoprotein unit membrane single unit membrane.
Lysosome exhibit polymorphism.

126
(a) Synthesis of protein
(b) Synthesis of lipid
(c) Synthesis of carbohydrate
(d) Oxidative phosphorylation
Rajasthan PMT-1995

Ans. (d) : Function of Golgi body in formation of oxidative phasphorylation.
- Glycosylation with the enzymes glycosyl transferase characteristic of Golgi complex, protein and lipids or glycosidated to form glycoprotein and glycolipids.
- Synthesis of protein in ribosome.
- Synthesis of lipid in smooth ER.

Synthesis of carbohydrate is take place in chloroplast through photosynthesis.

127. Action of lysozyme is
(a) physiological (b) anatomical
(c) morphological (d) none of these
DUMET-2007

Ans. (a) : Action of lysosomes is physiological. In the cell digestive enzyme are contained in lysosomes. Lysosomes are involved in intracellular digestion and are responsible for breakdown of parts of the cell and foreign particle of the cell.

128. Out of the given following disease, which disease results due to disorder in lysosomes?
(a) Arthritic joints
(b) Hurles syndrome
(c) Tay Sachs disease
(d) All of these
BVP-2006

Ans. (d) : Disorder in Lysosomes disease–
(1) Arthritic joints
(2) Hurles syndrome
(3) Tay sachs disease
All disease is lysosomal disorder disese.
Lysosomal storage disease are a group of over 10 rare inherited metabolic disorders that result from defects in lysosomal function.
- Tay-saches disease - also called GM_2 gangliosidosis is a rare inherited disorder that destroys nerve cell in the brain and spinal cord. Tay saches disease is typically found in people with certain ancestry, such as eastern European jews.

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- Hurler syndrome is caused by a deficiency of a lysosomal enzymes IUDA, which acid in the breakdown of dermatan sulfate and reparin sulfate [GAG]
- Arthritis also called joint Inflammation is an auto-immune disease.

129. Endoplasmic reticulum is in continuation with:
(a) Golgi body (b) Nuclear wall
(c) Mitochondria (d) Cell wall

BHU PMT (Screening)-2005

Ans. (b) : The ER is in continuation with the outer nuclear wall. The reason behind this is whenever a cell makes proteins, it transcribe mRNA from DNA that is present inside the nucleus.
The mRNA that is formed is then carried out of the nucleus into the rough endoplasmic reticulum (ER), Golgi body and lysosome are all membrane of a network of membrane but they are not continuous with one another.
• Mitocondria → Is double membrane structure and used aerobic respiration.

130. Golgi apparatus is absent in
(a) Higher plants
(b) Yeast
(c) Bacteria and blue-green algae
(d) Liver cells

BHU PMT (Mains)-2007
CGPMT - 2004

Ans. (c) : Golgi apparatus is absent in Bacteria and blue green algae because they are belongs to prokaryotes and lack Golgi apparatus.
• Golgi complex is found in all eukaryotic cells except RBCs.

131. The main function of lysosomes is
(a) digestion (b) replication
(c) translation (d) translocation

CG PMT-2004

Ans. (a) : The main function of lysosome is intra-cellular and extra cellular digestion and are responsible for breakdown of parts of the cell and foreign particle of the cell.

132. Endoplasmic reticulum is more developed in
(a) green cells (b) young cells
(c) mature cells (d) bacteriophage

CG PMT-2004

Ans. (b) : Endoplasmic Reticulum is more developed in young cell because in young cell during s phase produces enzymes (protein) and prepare cell form division and thus, requires more developed ER.
ER discovered by Porter in 1945
ER consist of a complex membraneous system in the cytoplasm of eukaryotic cell.
ER absent in prokaryotic and matured erythrocytes of mammals.

133. Which of the following organelle does not contain RNA?
(a) Chromosome (b) Plasmalemma
(c) Nucleolus (d) Ribosome

VMMC-2004

Ans. (b) : Plasmalemma does not contain RNA.
Plasma lemma is a thin membrane which is composed of lipid and protein and it surround the cytoplasm of the cell.
• Nucleolus - RNA and Protein
• Ribosome – rRNA and protein
• Chromosome – Each chromosome is made up of DNA highly coiled many times around proteins called histones that support its structure.

134. Fluid mosaic model was given by :
(a) Knoll and Ruska
(b) Singer and Ruska
(c) Singer and Nicolson
(d) Bateson and Punnet

Punjab MET-2004

Ans. (c) : Fluid mosaic model of plasma membrane given by singer and Nicolson. According these model there is a bilayer of lipid molecule with globular protein molecule.
- Knoll and Ruska – German engineer max knoll and physicist Earnest Ruska discovered electron microscope 1932.
- Bateson and Punnet _ Published the first account of genetic linkage in sweet peas and punnet developed the punnett square to depict the number and variety of genetic combination.

135. The fluidity of membranes in a plant in cold weather may be maintained by :
(a) increasing the number of phospholipids with unsaturated hydrocarbon tails
(b) increasing the proportion of integral proteins
(c) increasing concentration of cholesterol in membrane
(d) increasing the number of phospholipids with saturated hydrocarbon tail

BVP-2013
Punjab MET-2005

Ans. (a) : The fluidity of membrane in a plant in cold weather may be maintained by increasing the number of phospholipids with the presence of cholesterol tail.
Cholesterol can have both positive and negative effects on the fluidity of the cell membrane. At cold temperatures, cholesterol can help to keep the cell membrane more fluid. At higher temperature, cholesterol can help to stabilize the cell membrane and prevent it from becoming too fluid. The fluidity of a membrane increases as the percentage of unsaturated fatty acids in the phospholipid goes up.
Integral protein play critical role in movement of molecules across them.

136. Which type of membrane is most abundant within a cell?
(a) ER membrane (b) Nuclear membrane
(c) Golgi membrane (d) Plasma membrane

WB JEE-2008

Ans. (a) : The most abundant type of membrane within a cell is the endoplasmic reticulum. The ER is a membranous tubules that is found in the cytoplasm of eukaryotic cells. It consist of 30-60% of total cell membrane.

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137. Two membrane envelops is found in
(a) mitochondria, Golgi apparatus and chloroplast
(b) mitochondria, nucleus and chloroplast
(c) nucleus, Golgi apparatus and endoplasmic reticulum
(d) nucleus, ribosome and chloroplast

WB JEE-2015

Ans. (b) : Two membrane envelope is found in – mitochondria and chloroplast.
- Single membrane cell organelles – ER, Golgi body, Lysosome
- Membrane less cell organelles–Ribosome and centriole.

138. Structure of nuclear membrane helps in:
(a) organization of the spindle
(b) synapsls of homologous chromosome
(c) nucleo-cytoplasmic exchange of material
(d) anaphasic sepration of daughter chromosome

Rajasthan PMT-2005

Ans. (c) The nuclear membrane has a large number of pores with a diameter of 200-800 Å. Nuclear pores contain water soluble molecules and behave as shuttle between nuclear and cytoplasm. Nuclear pore also contain protein called unceloplasmic which is fascilitate nucleo-cytoplasmic exchange of material. The nuclear membrane is present in both the plant and animal cells. Cells carry out multitude of function such as protein building, conversion of unnecessary products.

J. Mitochondria

139. Which of the following is called power house of the cell?
(a) Protein (b) Mitochondria
(c) Lysosome (d) Karyolymph

UP CPMT-2010 / Karnataka CET-2004
MGIMS Wardha-2003 / AFMC-2001
J&K CET - 2000 / Rajasthan PMT - 1995

Ans. (b) : Mitochondria is called power house of the cell or kitchen of cell because they formed ATP, as a major energy source.

140. Extranuclear chromosomes are found in
(a) peroxysomes and mitochondria
(b) chloroplast and mitochondria
(c) mitochondria and ribosomes
(d) chloroplast and ribosome

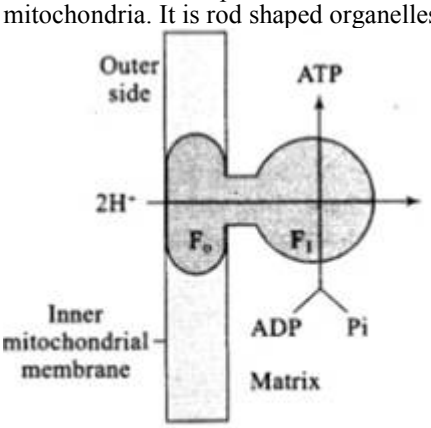
KVPY SA-2014 / Manipal-2013
Haryana PMT-2004
Rajasthan PMT-1996, 1995, 2001
AIPMT-2000,2001

Ans. (b) : Extranuclear chromosomes are found in chloroplast and mitochondria.
Chloroplast is an organelles that contains the photosynthetic pigment chlorophyll that captures sunlight and change it into useful energy, thereby releasing oxygen from water.
Mitochondria is known as powerhouse of the cell". It is an organelles found in the cell of most eukaryotes, such as animals plants and fungi.

141. Oxysomes or F_0–F_1 particles occur on
(a) Thylakoids
(b) Mitochondrial suffer
(c) Inner mitochondirial membrane
(d) Chloroplast surface

CMC Vellore-2010 / AMU-2009
Punjab MET - 2008
AIPMT-1992

Ans. (c) : Oxysomes or F_0–F_1 particles are spherical on knob like structures present in the inner membrane of the mitochondria. It is rod shaped organelles.



Diagrammatic presentation of ATP synthesis in mitochondria

142. In mitochondria, enzyme cytochrome oxidase is present in
(a) outer membrane
(b) perimitochondrial space
(c) inner membrane
(d) matrix

BVP – 2014
VMMC – 2009,2011
BHU PMT(screening) -2009
Uttarakhand PMT-2009

Ans. (c) : The enzyme cytochrome oxidase is present in inner membrane of mitochondria.
It is essential for aerobic energy generation in the form of ATP.

143. Who coined the term mitochondria?
(a) C.Benda (b) Altman
(c) Kollciker (d) None of these

JCECE-2005
Manipal-2000
Rajasthan PMT-1996
Punjab MET-2004

Ans. (a) : C. Benda → Introduced the term mitochondria in 1898.

144. Cristae are associated with which of the following ?
(a) Mitochondria
(b) Cytoplasm
(c) Protoplasm
(d) Endoplasmic reticulum

BCECE-2015
JCECE-2008
UP CPMT-2007

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Ans. (a) : The cristae are the folds of the inner membrane in mitochondria. The cristae increase the available surface area to enhance the Productivity of cellular respiration. and make mitochondria more efficient. Cristae create a large surface area for chemical reactions of oxidative phosphorylation.

145. Energy currency (reservoir) of the cells is :

(a) AMP (b) ATP
(c) RNA (d) DNA

UP CPMT-2012
BVP-2012
MGIMS Wardha-2006

Ans. (b) : ATP (adenosine triphosphate) is the energy currency of the cell. It is molecule that stores energy in its chemical bonds. When these bonds are broken, the energy is released and can be used by the cell to power its activities.

- AMP (adenosine monophosphate) is a less energy-rich molecule than ATP. It is a breakdown product of ATP, and it can be used to regenerate ATP.
- RNA (ribonucleic acid) and DNA (deoxyribonucleic acid) are nucleic acids that store genetic information.

146. What is mitoplast?

(a) Membraneless mitochondria
(b) Another name of mitochondria
(c) Mitochondria without outer membrane
(d) Mitochondria without inner membrane

WB JEE-2010
CMC Vellore-2007
VMMC-2006

Ans. (c) : Mitoplast is the isolated inner membrane-bound fraction of a mitochondrion, obtained by removing the outer membrane. It helps to study in various mitochondrial processes.

147. Which of the following are NOT considered as the part of endomembrane system ?

A. Mitochondria
B. Endoplasmic Reticulum
C. Chloroplasts
D. Golgi complex
E. Peroxisomes

Choose the most appropriate answer from the options given below :

(a) A, D and E only (b) B and D only
(c) A, C and E only (d) A and D only

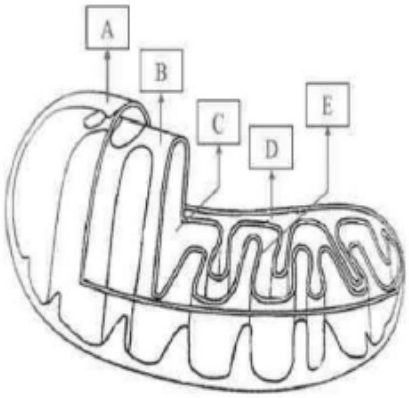
NEET (UG) 07.05.2023

Ans. (c) : The endomembrane system does not include mitochondria, chloroplasts or peroxisomes.

- Functions of mitochondria, chloroplast and peroxisomes are not coordinated with ER, golgi complex, lysosomes and vacuolas.

Hence, these are not considered as a part of the endomembrane system.

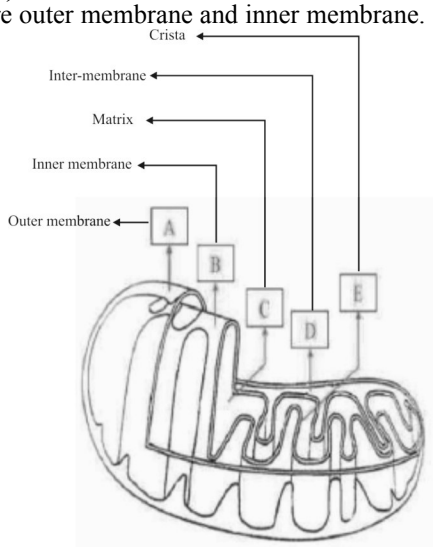
148. Go through the sectional view of a mitochondrion showing the different parts and identify the structures A to E?



(a) A–Outer membrane, B–Inner membrane, C–Matrix, D–Inter membrane space, E–Crista
(b) A–Outer membrane, B–Inner membrane, C–Inter membreans space, D–Matrix, E–Crista
(c) A–Outer membrane, B–Inner membrane, C–Matrix, D–Crista, E–Inter membrane space
(d) Outer membrane, B–Inner membrane, C–Crista, D–Matrix, E–Inter membrane space

AP EAPCET-07.09.2021 Shift-I

Ans. (a) : Mitochondria is double membrane bound structure outer membrane and inner membrane.



- Outer is smooth permeable and protein are porins.

Inner membrane is rough. Inner membrane folded inwards and form finger like projection called the cristae in animal cell. Mitochondria divided in a two chamber.
(1) outer chamber
(2) Inner chamber
Inner chamber is called matrix.

149. Inner mitochondrial membrane is differentiated from outer mitochondrial membrane in presence of _____

(a) Cristae
(b) Porins
(c) Porins and cholesterol
(d) Less protein and more lipid

AP EAMCET-05.10.2021 Shift-I

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Ans. (a): Inner mitochondrial membrane is differentiated from outer mitochondrial membrane in presence of cristae. These cristae increases surface area for ATP synthesis.
The inner membrane forms numerous folds (cristae), which extend into the interior (matrix) of organelle.

150. Match List-I with List-II.

List-I		List-II	
(A)	**Cristae**	**(i)**	**Primary constriction in chromosome**
(B)	**Thylakoids**	**(ii)**	**Disc-shaped sacs in Golgi apparatus**
(C)	**Centromere**	**(iii)**	**Infoldings in mitochondria**
(D)	**Cisternae**	**(iv)**	**Flattened membranous sacs in stroma of plastids**

Choose the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(ii)	(iii)	(iv)	(i)
(b)	(iv)	(iii)	(ii)	(i)
(c)	(i)	(iv)	(iii)	(ii)
(d)	(iii)	(iv)	(i)	(ii)

NEET-2021

Ans. (d) : (a) **Cristae** - Infoldings in mitochondria (Inner membrane)
(b) **Thylakoids** - Flattened membranous sacs in stroma of plastids.
(c) **Centromere** - Primary constriction in chromosome.
(d) **Cisternae** - Disc shaped sacs in golgi apparatus.

151. Chondriosome was discovered by ———
(a) Benda (b) Sutton
(c) Tatum (d) Palade

AP EAMCET-24.09.2020 Shift-I

Ans. (a) : Chondriosome were discovered by Benda in 1888, as it is resembled with cartilage hence it is termed as chondriosome.
- Sutton- discovered chromosomes in 1902.
- Tatum- discovered genes in 1941.
- Palade- discovered the endoplasmic reticulum in 1955.

152. Which is wrong about mitochondria?
(a) Site of aerobic respiration
(b) Supported by double unit membrane
(c) Infolding of inner membrane forms cristae
(d) Many circular DNA and few ribosomes are found in matrix.

AIIMS-26.05.2019 Shift-I

Ans. (d) : Mitochondria have circular DNA, but they have also a lot of ribosomes. So the statement (d) that there is few ribosomes in the matrix is wrong. All other statements are correct about mitochondria. They are the site of aerobic respiration, they are supported by a double unit membrane, and the infolding of the inner membrane forms cristae

153. Which one of the following explained by the endosymbiotic theory?
(a) The interaction between bacteria and viruses
(b) The symbiosis between plants and animals
(c) The origin of mitochondria and chloroplast
(d) The evolution of multicellular organisms from unicellular ones

KVPY SB & SX-2019

Ans. (c) : The endosymbiotic theory states that the mitochondria and chloroplast in eukaryotic cells once a separate prokaryotic microbes. This theory explain the origin of eukaryotic cells. This theory is given by Hilman.

154. Which of the following structures is found on the inner surface of the inner mitochondrial membrane?
(a) Microsome (b) Oxysome
(c) Sub-unit of Parson (d) Quantasome

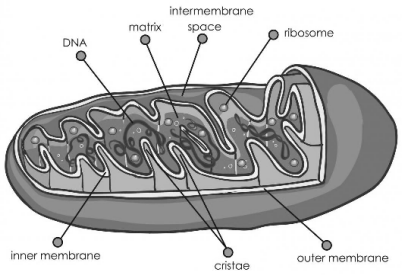
Tripura JEE-2019
AMU-2001

Ans. (b) : Oxysome structures is found on the inner surface of the inner mitochondrial membrane. They are also called - F_1 Particles or ATP syntheses. They play important role in the formation of energy for the functioning of the cell.
- **Microsome :** It is a heterogeneous set of vesicular 20-200 nm in diameter and formed from the endoplasmic reticulum when cells are distrupted.
- **Quantasome :** It is particle found in the thylakoid membrane of chloroplasts in which photosynthesis takes place.
- **Sub-unit of Parson**–Stalk less mitochondrial particles present on outer membrane.

155. Choose the incorrect about mitochondria -
(a) Has 80S ribosome
(b) Naked circular DNA
(c) ETS on inner mitochondrial membrane
(d) Power house of the cell

AIIMS-26.05.2018 Shift-II

Ans. (a) : Mitochondria have single circular naked DNA molecule along with lots of ribosomes. These ribosomes are 70S type, which are further involved in mitochondrial protein synthesis, so the option (a) is incorrect about mitochondria.



156. Protein molecules that form huge pores in the membranes of the plastids, mitochondria and some bacteria are called as
(a) Stomata (b) Porins
(c) Coherin (d) Subarins

TS EAMCET-12.05.2017

@apna_pdf

Ans. (b) : The porins are proteins that form huge pore in the outer membrane of mitochondria, plastids and some bacteria. These act as channels to specific substance.

- Subarins is chiefly deposited in the cell of cark.
- Stomata are tiny pores through which plants breathe. They are found on the upper and lower side of leaves, on flower, petals and stem.
- Coherin is a peptide isolated from the bovine posterior pituitary gland.

157. Fernandez-Moran subunit can be observed in

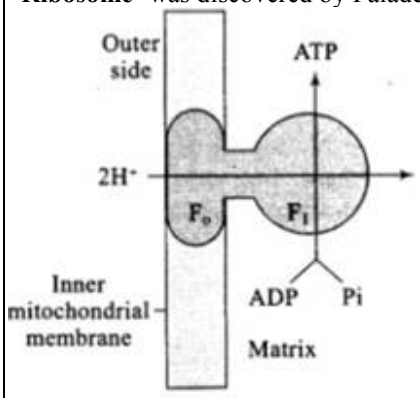
(a) lysosome (b) endoplasmic reticulum
(c) mitochondria (d) ribosome

Tripura JEE-2017

Ans. (c) : Fernandez-Moran subunit can be observed in mitochondria. On the inner face towards the matrix of the cristae there are $F_0 - F_1$ particle also called oxysome, are an elimentory particle or electron transport particle. Discovered by Fernandez-Moran therefore also called as sub-unit of the moron. The number of such mitochondria is 104 - 105

•**Lysosomes**- was discovered by de Duve 1949

•**Ribosome**- was discovered by Palade in 1955



Diagrammatic presentation of ATP synthesis in mitochondria

158. Extranuclear inheritance is a consequence of the presence of genes in:

(a) ER and mitochondria
(b) lysosomes and ribosomes
(c) ribosomes and chloroplast
(d) mitochondria and chloroplasts

WB JEE-2006

Ans. (d) : Extra nuclear inheritance is a consequence of the presence of genes in mitochondria and chloroplast. These organelles have their own DNA, which is separate from the DNA in the nucleus.

The genes in mitochondria and chloroplasts are responsible for a variety of cellular functions, including energy production, photosynthesis and cell signaling. These organelles are regarded as semi-autonomous organelle.

159. Cristae help in :

(a) respiration (b) transpiration
(c) photosynthesis (d) photo-oxidation

Manipal - 2002
AFMC-2000

Ans. (a) : Cristae is a inner membrane of mitochondria which is folds like a projection of finger. The cristae increase the surface area. Mitochondria are the site of aerobic respiration. They produce cellular energy in the form of ATP, hence they are called power house of cell.

160. Which of the following is the phosphorylating unit?

(a) Oxysome (b) Mesosome
(c) peroxisome (d) Mitochondria

AFMC-2000

Ans. (a) : Oxysome also known as F_1 particles, are the phosphorylating unit of mitochondria. They contain enzyme ATP synthase and located in the inner membrane of mitochondria, which are responsible for the synthesis of ATP.

161. At what speed the mitochondria can be separated out by differential centrifugation?

(a) 200 xg (b) 500 xg
(c) 800 xg (d) 8000 xg

AMU-2015

Ans. (d) : Separation of mitochondria by differential centrifugation is done at a speed of 8000 xg. This is because the mitochondria is more dencer than other cell organelle.

162. Which one is main barrier in transportation in mitochondria that maintains composition of matrix?

(a) Inner membrane
(b) Outer membrane
(c) Perimitochondrial fluid
(d) All of these

Rajasthan PMT-1996

Ans. (a) : Inner membrane is main barriers in transportation in mitochondria that maintains composition of matrix. It is a functional barrier to the passage of small molecules between the cytosol and matrix and maintain the proton gradient that drises oxidative phosphorylation. Matrix function are used at numerical methods for ordinary differential equations and statisties.

163. Mitochondria will be found in abundance in cells of tissues having

(a) minimum activity (b) average activity
(c) maximum activity (d) None of these

Manipal-2011

Ans. (c) : Mitochondria will be found in abundance in cells of tissues having maximum activity because they require lot of energy for perform their metabolic activity.

164. Which part of the sperm has the aggregation of Golgi bodies?

(a) Middle piece (b) Tail
(c) Axial filament (d) Acrosome

JIPMER-1999

Ans. (d) : During sperm formation Golgi apparatus forms the acrosome.

Acrosome contain a number of hydrolytic enzyme which helps in penetration of egg's coat through sperm.

@apna_pdf

165. Which of the following cell organelle is excluded from endomembrane system?
(a) Endoplasmic reticulum
(b) Mitochondria
(c) Golgi complex
(d) Lysosomes
(e) Vacuoles

Kerala PMT-2015

Ans. (b) : Endoplasmic reticulum (ER), Golgi complex, lysosomes and vacuoles are considered together as an endo-membrane system because their functions are co-ordinated but mitochondria is not considered as part of the endo-membrane system.

166. Which one of the following organelles can synthesize some of its own proteins
(a) lysosome (b) vacuole
(c) Golgi apparatus (d) mitochondrion

KVPY SA-2012

Ans. (d) : Mitochondria have their own independent genetic material and protein synthesis machinery, which allows them to produce some of their proteins within the organelle itself.

167. In which compartment of a cell does the process of glycolysis takes place?
(a) Golgi complex (b) mitochondria
(c) cytoplasm (d) ribosomes

KVPY SA-2012

Ans. (c) : Glycolysis takes place in the cytoplasm.Glycolysis is the series of reactions that convert glucose into pyruvate. It is oxygen- independent reaction.

168. The size of mitochondria in plant cell is
(a) 0.1-10 µm long (b) 1.0-4.0 µm long
(c) 2.0-4.0 µm long (d) 3.0-4.0 µm long

AMU-2010

Ans. (b) : Mitochondria are typically round to oval in shape and size from 1.0-4.0 µm long.

169. The catalase-containging vesicles present in liver and leaf cells are called
(a) glyoxisomes (b) lysosomes
(c) peroxisomes (d) polyribosomes

AMU-1999

Ans. (c) : The catalase-containging vesicles present in liver and leaf cells are called peroxisomes. The presence of catalase in peroxisomes allow these organelles to effectively deal with reactive oxygen species and protect the cell from oxidative damage.

170. The percentage of proteins in the mitochondrial membrane is
(a) 20 (b) 50
(c) 80 (d) 100

AMU-1999

Ans. (b) : Mitochondria have the following chemical composition:-

Protein	50-70%
Phospholipid	25-35%
RNA	0.50%
DNA	Traces

171. The inner membrane of mitochondria bears folding / finger like projections called cristae, these cristae:
(a) increases thickness of wall
(b) increases surface area
(c) increases ATP supply
(d) keep external substance away

VMMC-2006

Ans. (b) : The inner membrane of mitochondria bears folding finger like projections called cristae. These cristae increases surface area to enhance the productivity of cellular respiration .

172. Which of the following cell organelle is related to respiration?
(a) Nucleus (b) Vacuole
(c) Chloroplast (d) Mitochondria

UP CPMT-2001

Ans. (d) : The primary function of mitochondria is to perform cellular respiration.

173. The organelle which bear anthocyanins is:
(a) cholroplast (b) chromoplast
(c) vacuole (d) itioplast

Manipal-2000

Ans. (c) : Vacuole contains colors pigment 'anthocyanin which is water soluble in nature responsible for colour of fruits and flowers.

174. Which of the following observations most strongly support the view that mitochondria contain electron transport enzymes aggregated in compact association?
(a) Mitochondria have highly folded inner wall
(b) Disruption of mitochondria yields membrane fragments, which are able to synthesis ATP
(c) A contractile protein capable of utilise ATP, which has been otained from mitochondria
(d) Mitochondria is animal embryos have tendency to concentrate in cells, which are to become locomotory strucrures

Manipal-2015

Ans. (b) : The observation which most strongly support the view that mitochondria contain electron transport enzymes aggregated into compact association is that the disruption of mitochondria yields membrane fragment which are able to synthesis ATP.

175. Oxysomes are located inside :
(a) Golgi body (b) lysosomes
(c) plastids (d) mitochondria

JIPMER-2001

Ans. (d) : Oxysomes are. the structure which are present on the surface of inner membrane of mitochondria. Also called f_0 F_1 particles. They are responsible for ATP synthesis.

176. Maternal inheritance is due to the genes present in :
(a) lysosome (b) nucleoplasm
(c) nucleus (d) mitochondria

JIPMER-2001

@apna_pdf

Ans. (d) : Maternal inheritance is due to the genes present in mitochondria. It is generally observed in many eukaryotes.

Nucleoplasm It is a clear fluid medium in which all the contents of the nucleus are embedded.

Lysosome It is membrane-enclosed organelles that contain an array of enzymes capable of breaking down all types of biological polymers-proteins, nucleic acids, carbohydrates, and lipids.

Nucleus It is membrane-enclosed organelle within a cell that contains the chromosomes.

177. ATP synthesis occurs on the

(a) outer membrane of mitochondria
(b) inner membrane of mitochondria
(c) matrix
(d) None of the above

Manipal-2013

Ans. (b) : ATP synthesis takes place in the ATP synthase complex of the electron transport chain, by the process of oxidative phosphorylation which is found in the inner mitochondrial membrane. It is fuelled by the proton gradient created by oxidation of high energy molecules such as NADH and $FADH_2$. The enzyme which is required for ATP synthesis is ATP synthatase which convert the ADP and Pi to ATP.

178. Which is substitution of mitochondria in E. coli?

(a) Golgi body (b) Mesosome
(c) Ribosome (d) Glyoxysomes

JIPMER-2013

Ans. (b) : Mesosome is substitution of mitochondria in E. Coli. Mesosomes are folded invaginations in the plasma membrane of bacteria that are produced by the chemical fixation techniques used to prepare samples for electron microscopy.

E. Coli is a type of bacteria that normally lives in our intestines.

179. Amount of DNA present in the mitochondria of Neurospora is

(a) 10% (b) 40%
(c) 1% (d) nil

BHU PMT (Screening)-2011

Ans. (c) : Amount of DNA present in the mitochondria of Neurospora is 1%

Neurospora is a genus of widespread species, produces bakery mold or red bread mold. It has been used extensively in genetic and biochemical investigations.

Neurospora is used as model organism because it is a easy to grow and has a haploid life cycle that makes genetic analysis simple.

180. The function of glyoxysome is :

(a) protein metabolism
(b) carbohydrate metabolism
(c) fat metabolism
(d) protein synthesis

DUMET-2001

Ans. (c) : The function of glyoxysomes is to convert fats into carbohydrates in certain plant tissues. The primary function of glyoxysomes is to perform glyoxylate cycle which enables plant to use stored fats as a source of carbon and energy when other carbohydrates are limited or unavailable.

Glyoxysomes are found in abundance in germinating seeds.

181. The cell organelle involved in the glycosylation of proteins is

(a) ribosome
(b) peroxisome
(c) mitochondria
(d) endoplasmic reticulum

Haryana PMT-2010

Ans. (d) : The cell organelle involved in the glycosylation of proteins is endoplasmic reticulum. It forms a series of flattened sacs inside the cytoplasm of eukaryotic cells.

- **Glycosylation :** The bonding of sugar residues to another organic compound is glycosylation.
- **Peroxisomes :** Peroxisomes are small vesicle , single membrane-bound organelles found in the eukaryotic cells. They do not have their own DNA.
- **Ribosome** – Protein factory.
- **Mitochondria** – Power-house of the cell.

182. Enzymes found attached to inner membrane of mitochondria instead of matrix is/are :

(a) succinic dehydrogenase
(b) cytochrome oxidase
(c) both (a) and (b)
(d) malicdenhydrogenose

AFMC-2006

Ans. (c) : Enzymes found attached to inner membrane of mitochondria instead of matrix is /are succinic dehydrogenase and cytochrome oxides.

Cytochrome take part in redox reaction and electron transport.

The succinate dehydrogenase act as catalyst.

183. Which cell organelle show polymorphism?

(a) Lysosomes
(b) Ribosomes
(c) Peroxisomes
(d) Endoplasmic reticulum

BVP-2013

Ans. (a) : Lysosomes show polymorphism. This means that they exist in multiple forms within the cell. There are four main type of lysosomes:

(i) Primary lysosomes
(ii) Secondary lysosomes
(iii) Residual bodies
(iv) Autophagic vacuoles.

- **Endoplasmic reticulum :** It is network of sac-like structures and tubes in the cytoplasm (gel - like fluid) of a cell. Proteins and other molecules move though the endoplasmic reticulum.
- **Peroxisomes :** They are small vesicles, single membrane -bound organelles found in the eukaryotic cells. They contain digestive enzymes for breaking down toxic materials in the cell.
- **Ribosomes** are protein factory where protein is synthesize. It is small granular structure found in both prokaryotes and eukaryotes.

@apna_pdf

184. Pyruvate dehydrogenase complex needed for the conversion of pyruvic acid to Acetyl Co-A is located in

(a) Intermembranal space of mitochondria
(b) Matrix of mitochondria
(c) Cytoplasm
(d) Grana of chloroplast

Karnataka CET-2010

Ans. (b) : In eukaryote, the pyruvate dehydrogenase complex Catalyzes the reaction of the formation of acetyl Coenzyme from the pyruvates . It is found in the matrix of mitochondria.
It catalyzes the irreversible oxidative decarboxylation of pyruvate into acetyl-coA and CO_2.

185. The powerhouse of cell is first discovered by

(a) C Benda in 1897 (b) Kolliker in 1850
(c) Claude in 1880 (d) Kingsburg in 1882

JIPMER-2016

Ans. (b) : The power house of cell is first discovered by kolliker in 1850. Later the term mitochondria is given by C. Benda in 1897.

186. Read the two statements A and B

Statement A : The number of mitochondria in a cell do not correspond to the function of the cell.

Statement B : Mitochondria are common to both plant and animal cells.

Choose the correct option from those given.

(a) Statement A is Correct, B is wrong
(b) Statement B is Correct, A is wrong
(c) Both the Statements A and B are correct
(d) Both the Statements A and B are wrong

Karnataka CET-2006

Ans. (b) : Mitochondria are common to both plant and animal cells. Mitochondria have double membrane bound structure with own circular DNA. The number of mitochondria is corresponding to the function of cell due to the amount of energy required by the cells. Different cells functions requires different amount of energy, for example: Brain cells require more energy in comparison to skin cell. Mitochondria also called 'powerhouse of the cell due to storage of energy in form of ATP.

187. Mitochondria and chloroplast are

A. Semi-autonomous organelles
B. formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery

Which one of the following options is correct?

(a) Both (A) and (B) are false
(b) Both (A) and (B) are correct
(c) (B) is true but (A) is false
(d) (A) is true but (B) is false

NEET-2016 Phase-I

Ans. (d) : Mitochondria and chloroplast are called semi-autonomous cell organelles. They both contain their own double-stranded circular DNA and ribosomes called mitoribosomes.
They formed by division of pre-existing organelles and they contain DNA as well as their own protein some of their protein themselves.

188. Which one of the following has its own DNA?

(a) Mitochondria (b) Dictyosome
(c) Lysosome (d) Peroxisome

AIPMT (Screening)-2010

Ans. (a) : Mitochondria and chloroplast are double membrane, semiautonomous organelle, having their own circular DNA and ribosome. Mitochondria are also known as semi-autonomous cell organelles because they can self-duplicate and makes protein by the presence of DNA.

189. Genes for cytoplasmic male sterility in plants are generally located in

(a) Mitochondrial genome (b) Cytosol
(c) Chloroplast genome (d) Nuclear genome

JIPMER-2007

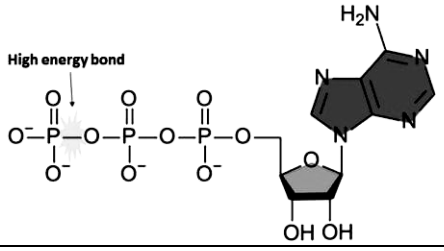
Ans. (a) : The genes for cytoplasmic male sterility in plants are generally located in the mitochondrial genome. This phenomenon is known as cytoplasmic male sterility (CMS) and is commonly utilized in plant breeding and hybrid seed production. CMS is a genetic condition in plants where the stamen of plant fail to produce functional pollen due to certain gene located in the mitochondrial genome of the plant.

190. ATP is:

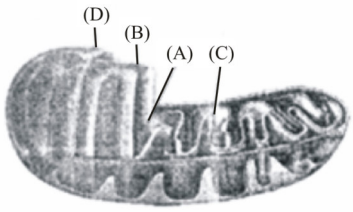
(a) Nucleotide (b) Nucleoside
(c) Nucleic acid (d) Vitamin

AIPMT-2000

Ans. (a) : ATP or Adenosine triphosphate is a **nucleotide** as it is composed of **adenine, ribose sugar and phosphoric acid**. There are three additional phosphate groups attached to the phosphate group of Adenosine monophosphate (AMP). The last two phosphate molecules are connected by high energy bonds.



191. The figure below shows the structure of a mitochondria with its four parts labelled (A), (B), (C) and (D) Select the part correctly matched with its function



(a) Part (A) : Matrix – major site for respiratory chain enzymes
(b) Part (D) : Outer membrane – gives rise to inner membrane by splitting
(c) Part (B) : Inner membrane – forms infoldings called cristae

@apna_pdf

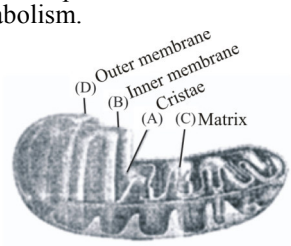
(d) Part (C) : Cristae – possess single circular DNA molecule and ribosome

CMC Vellore-2015
AIPMT (Mains)-2011

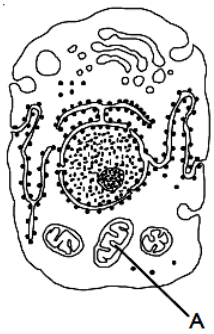
Ans. (c) : Mitochondria are double membrane - bound structure with the outer membrane and the inner membrane dividing its lumen distinctly into two aqueous compartments, i.e, the outer compartment and the inner compartment.

- The inner membrane forms a number of infolding called the **cristae** towards the matrix. The cristae increase the surface area.

The matrix contains the mitochondrial genetic system as well the enzyme responsible for the central reactions of oxidative metabolism.



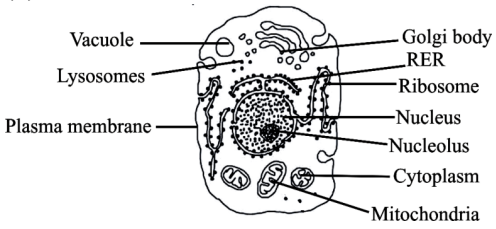
192. Select the alternative giving correct identification and function of the organelle 'A' in the diagram



(a) Endoplasmic reticulum-synthesis of lipids
(b) Mitochondria-produce cellular energy in the form of ATP
(c) Golgi body-provides packaging material
(d) Lysosomes - secrete hydrolytic enzymes

NEET (Karnataka)-2013

Ans. (b) :



- Mitochondria are the sites of aerobic respiration. They produce cellular energy in the form of ATP.

193. Mitochondria and chloroplast are regarded, endosymbionts because:

(a) they do not have de-novo origin
(b) they both possess nucleic acids
(c) their membranes are like those: prokaryotes
(d) all of the above

J&K CET-2002

Ans. (d) : Mitochondria and chloroplasts are considered endosymbionts of cells because they fulfill all three criteria mentioned:

(a) They do not have a de-novo origin, meaning they are not formed from scratch within the host cell. Instead, they are believed to have originated from free-living prokaryotic organisms that were engulfed by ancestral eukaryotic cells.

(b) Mitochondria and chloroplast have their own DNA.

(c) Their membranes are similar to those of prokaryotes. Both organelles have a double-membrane structure, which resemble the membrane found in many prokaryotic cells.

194. Assertion:Mitochondria help in photosynthesis.
Reason: Mitochondria have enzymes for dark reaction.
(A) If both (A) and (R) are true and the (R) is correct explanation of the (A).
(B) If both (A) and (R) are true but the (R) is not correct explanation of the (A).
(C) If the (A) is true but the (R) is false.
(D) If both the (A) and (R) are false.
(E) If (A) is false, but (R) is true.

(a) A (b) B
(c) C (d) D
(e) E

AIIMS-1999

Ans. (d) : Mitochondria play a critical role in the generation of metabolic energy in eukaryotic cell. As they are responsible for most of the useful energy derived from the breakdown of Carbohydrate and fatty acids which is converted to ATP by the process of oxidative phosphorylation.

The mitochondrial matrix contains a large variety of enzymes including those that convert pyruvate and fatty acid to Acetyl. CoA to CO_2 through the citric acid cycle. Large amounts of NADPH [And $FADH_2$] are produced by these oxidation reaction.

195. Animal cells after removal of nuclei still contained DNA The source of this DNA is

(a) nucleosomes (b) mitochondria
(c) peroxisomes (d) lysosome

KVPY (SA)-2013

Ans. (b) : Animal cells after removal of nuclei still contained DNA The source of this DNA is mitochondria this genetic material is k/a mitochondrial DNA or mt DNA. Thus, after the removal of nuclei the cell still have mt DNA.

- **Peroxisomes** – contains many enzymes for peroxide biosynthesis two importance enzyme in peroxisomes are urate oxidize and catalase.
- **Lysosomes** – The simplest definition of a lysosomes is body rich in acid hydrolase.
- **Nucleosome** – is the basic structural unit of DNA Packaging in eukaryotes.

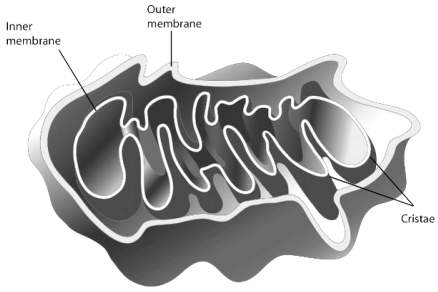
196. Foldings of inner membrane of mito-chondria are called

(a) sacs (b) endoplasm
(c) cristae (d) grana

AIIMS-1998 / AIPMT-1994

@apna_pdf

Ans. (c) : Foldings of inner membrane of mito-chondria are called cristae.



Cristae cause an increase in the total surface area, cristae bears subunits called oxysomes. It enhance the productivity of cellular respiration.

Elementary particles, F_1 particles electron transport particles inner membrane subunit or Fernandez Moran particles.

- **Grana** – Photophosphorylation is the process in which light energy is converted into chemical energy through the production of ATP it is the process of formation of ATP from ADP and inorganic phosphate (P_1) utilizing light energy. It occur in grana of chloroplast during photosynthesis.
- **Endoplasm-** The endoplasm refers to the inner dense part of the cytoplasm and is often granulated.

197. Chemiosmosis hypothesis given by Peter Mitchel proposes the mechanism of .....

(a) synthesis of NADH
(b) Synthesis of ATP
(c) Synthesis of $FADH_2$
(d) Synthesis of NADPH

Karnataka CET-2011

Ans. (b) : The chemiosmotic hypothesis explains how ATP is formed in the process of oxidative phosphorylation during cellular respiration. It involves the movement of proton (H+) across a membrane, creating an electrochemical gradient, and the flow of these protons back through the membrane via ATP synthase, which leads to the synthesis of ATP.

198. Which of the following statements regarding mitochondrial membrane is not correct ?

(a) The outer membrane is permeable to all kinds of molecules
(b) The enzymes of the electron transfer chain are embedded in the outer membrane
(c) The inner membrane is highly convoluted forming a series of infoldings
(d) The outer membrane resembles a sieve

AIPMT-2006

Ans. (b) : The enzymes of the electron transfer chain are not embedded in the outer mitochondrial membrane. Instead, they are embedded in the inner mitochondrial membrane. In inner membrane various cellular respiration and ATP production takes place, while the outer membrane serve as boundary, and allows the passage of various molecules into the inter-membrane space.

199. In which part of mitochondria does ATP synthesis occur?

(a) F_1
(b) F_0
(c) Cristae
(d) Inner membrane of mitochondria

JIPMER-2005

Ans. (d) : The inner membrane of the mitochondria contains the component of the electron transport chain oxidation / reduction reactions along the components of the electron transport chain generate a proton gradient that is used by ATP syntheses to phosphorylase ADP, there by producing ATP.

200. Genes present in the cytoplasm of eukaryotic cells are found in

(a) Mitochondria and inherited via egg cytoplasm
(b) Lysosomes and peroxisomes
(c) Golgi bodies and smooth endoplasmic reticulum
(d) Plastids and inherited via male gamete

AIIMS-2006

Ans. (a) : The cytoplasm of eukaryotic cells contains organelles such as Mitochondria, Chloroplasts, Golgi bodies, Lysosomes, Peroxisomes etc.

- Mitochondria and chloroplasts contain DNA and genes, genes are found on the chromosomes, chromosomes are made up of DNA and associated proteins.
- During fertilization, the sperm contributes genetic material to the nucleus of the egg, while the cytoplasm, including mitochondria with their genes, is mainly derived from the egg. As a result, mitochondrial DNA is inherited from the mother, and any mutations or variations in these genes are passed down to the offspring through the maternal line. This known as maternal inheritance of mitochondrial DNA.
- Hence, organelles that are present in egg's cytoplasm, also inhibit to the offspring's.

201. Which of the following organelie is common in plants and animals?

(a) Mitochondria (b) Chloroplast
(c) Tonoplast (d) Centrioles

DUMET-2003
J&K CET-2000

Ans. (a) :

Organelle	Plant cell	Animal cell
Mitochondria	Present	Present
Tonoplast	Present	Absent
Chloroplast	Present	Absent
Centrioles	Absent	Present
Cell wall	Present	Absent

202. Both oxysomes and quantasomes are found in:

(a) chloroplasts (b) mitochondria
(c) both (a) and (b) (d) none of the above

J&K CET-2000

@apna_pdf

Ans. (c) : Oxysomes are the structures which are present on the surface of inner membrane of mitochondria.
Quantasomes are the photosynthetic units present in the thylakoides of chloroplast. so,
Both oxysomes and quantasomes are found in mitochondria and chloroplast.

203. Which of the following cell organelles is rich in catabolic enzymes?
(a) Chloroplast (b) Mitochondria
(c) Golgi complex (d) Ribosomes

MP PMT-2013
Punjab MET-2007

Ans. (b) : Mitochondria contain membrane catabolic enzymes that are involved in breaking down complex molecules, such as carbohydrates and fatty acids, through a process called cellular respiration. In contrast, chloroplast are involved in photosynthesis, Golgi complex in involved in protein modification & transport and ribosomes are cellular structure involved in protein synthesis. None of the organelle play a significant role in catabolic processes.

204. The mechanism of ATP formation both in chloroplast and mitochondria is explained by
(a) relay pump theory of Godlewski
(b) Choldny-Wents model
(c) chemiosmotic theory
(d) Munchs mass-flow hypothesis

JCECE-2012

Ans. (c) : The mechanism of ATP formation both in chloroplast and mitochondria is explained by chemiosmotic theory by Peter D. This theory proposes that ATP synthesis occurs through the establishment of a proton gradient across the inner membrane of mitochondria and the thylakoid membrane. The flow of proton (H^+) back into the matrix of stroma through ATP synthase leads to the production of ATP.

205. The organelle associated with aerobic respiration is:
(a) chloroplast (b) centriole
(c) nucleus (d) mitochondria

J&K CET-2005

Ans. (d) : Mitochondria is called power house of the cell. The energy is released in it through cellular respiration within the cell is the site of respiration.
- The organelles in which aerobic respiration (cellular respiration) occurs in the cell are mitochondria
- Mitochondria are present in the aerobic organism only.

206. The prokaryotic cell does not contain :
(a) chromosome (b) mitochondria
(c) plasma membrane (d) ribosome

J&K CET-2005

Ans. (b) : Mitochondria are organelles founds in the cytoplasm of plants and animals. The prokaryotic cells lack membrane bounded cell organelles like mitochondria, chloroplast, ER etc.
mesosomes of prokaryotes (bacteria) is analogues to mitochondria in eukaryotes.
chromosome, plasma membrane, Ribosome are present in both prokaryote.

207. Which of the following is a component of electron transport chain in mitochondria?
(a) Phytochrome (b) Cytochrome oxidase
(c) Plastocyanin (d) Carotenoids

DUMET-2002

Ans. (b) : ETC is a stepwise process of electron transfer that carries out final oxidation to produce energy as ATP on the related enzymes.
Enzymes in ETC is cytochrome oxidase which forms a complex and caries electrons down the energy level. The released energy is cytochrome oxidase. Cytochrome oxidase or complex IV is the last enzyme in the respiratory electron transport chain. It receives an electron from each of 4 cytochrome molecule and transfers them to one oxygen and 4 protons producing 2 molecule of H_2O.

208. The cisternae that make up the Golgi complex are:
(a) rough (b) polarized
(c) non-polarized (d) reticulate

MP PMT-2013

Ans. (b) : Cisternae are flat disc shaped, sac like structure. Cristae are polarized with 2 face-
(i) The convex surface of the cisternae is called cis or forming face.
(ii) Concave surface of the cisternae is called trans or maturing face.
Cis is present near rough ER and trans is present near plasma-membrane. Some cisternae may form reticulate structure instead of flattened disc.

209. In active lead cells, the double membrane is absent in:
(a) Mitochondira (b) Chloroplast
(c) Nucleus (d) Lysosomes

MP PMT-2013

Ans. (d) : Lysosomes is a single membrane cell organelle.
- Double membrane cell organelle- Mitochondria, nucleus and chloroplast.

210. Mitochondrial porins are located in
(a) the outer membrane
(b) the inner membrane
(c) inner-membrane space
(d) both outer and inner membranes

AMU-2014

Ans. (a) : Mitochondrial porins are found in the outer membrane of mitochondria. They play a crucial role in regulating the transport of molecules between the cytosol and the inter-membrane space of the mitochondria.

211. Where does the synthesis of ATP mitochondria takes place?
(a) In matrix (b) In intercristal space
(c) Upon cristae (d) At outer membrane

J&K CET-2013

Ans. (c) : Synthesis of ATP does takes place in cristae of mitochondria.
- The function of ATP synthesis is to synthesize ATP from ADP and inorganic phosphate [P_1] in the F_1 sector.
- Matrix is the site of TCA cycle a series of enzymes reaction initiated by the conversion of pyruvate and

@apna_pdf

fatty acid to acetyl coenzymes A [acetyl CoA] pyruvate and fatty acid are transported into mitochondria from the cytoplasm by membrane – bound permeases.

- Outermembrane is smooth and more permeable and protein are porins.

212. Major function of mitochondria in a cell is

(a) secretion (b) excretion
(c) osmoregulation (d) fat synthesis

Punjab MET-2011

Ans. (d) : Mitochondria store ATP and take part in elongation of fatty acids and synthesis of phospholipids. Major function of mitochondria in the cell is oxidation of fat, synthesis of protein, cytoplasmic inheritance, synthesis of homeoport of hemoglobin.
Aerobic respiration occurs in mitochondria.

213. The significance of mitochondria was given by:

(a) Flemming (b) Meves
(c) Mendel (d) Altman

MGIMS Wardha-2012
Rajasthan PMT-1999

Ans. (d) : Altman 1890 observed these structure and named the bioblasts (life germs).
The significance of mitochondria was given by Altman.

- Flemming 1882 described these organelles as filia.
- Mendel known for their contribution in genetics.
- Meves known for his studies on spermatozoa.

214. Mitochondria contains :

(a) only DNA (b) DNA and RNA
(c) only RNA (d) none of these

MGIMS Wardha - 2012
Rajasthan PMT-1999

Ans. (b) : Mitochondria contains is circular double stranded DNA and RNA.
Due to the presence of DNA polymerase, RNA polymerase, 70s Ribosome's, mitochondria synthesis occurs. Mitochondria also possess small amount of mRNA, tRNA and mRNA. Some protein, remaining proteins synthesized under the control of nuclear DNA therefore, called as semiautonomous organelles.

215. Which of the following is common in chloroplast and mitochondria?

(a) Both are not a component of endomembrane system
(b) Both contain small amount of DNA
(c) Both are found in animal cells
(d) Both involved in respiration
(e) (a) and (b) both

UP CPMT-2012

Ans. (e) : Both chloroplast and mitochondria contain a small amount of DNA, RNA and ribosomes (70S type) thus involved in protein synthesis and both are not a component of endomembrane system.

- Chloroplast is exclusively present in plant cells responsible for photosynthesis.
- Only mitochondria involved in respiration.

216. Which of the following statement is not true with reference to mitochondria?

(a) They contain DNA
(b) They divide in synchrony with cell cycle
(c) They store and release chemical energy
(d) They contain cristae

Karnataka CET-2005

Ans. (b) : Mitochondria is a double membrane bound structure. It contain DNA, so called 'semi–autonomous cell organelle. Mitochondria store and release chemical energy, called 'power house of the cell'. It also contain cristae, which is folds in the inner mitochondrial membrane. These folds increases the surface area of inner membrane, where energy (ATP) production occurs.

217. Mitochondria are absent in :

(a) red algae (b) green algae
(c) brown algae (d) bacteria

J&K CET-2001

Ans. (d) : Mitochondria are not found in prokaryotes and mature RBC in human. Hence, mitochondria absent in bacteria. Algae are mostly eukaryotes organism with only a few exception. Blue green algae are prokaryotes, do not possess mitochondria.

218. Which of the following statements is correct?

(a) Mitochondria contain circular DNA, but chloroplasts lack it
(b) Chloroplasts contain circular DNA, but mitochondria lack it
(c) Neither mitochondria nor chloroplasts contain any DNA
(d) Both mitochondria and chloroplasts contain circular DNA

J&K CET-2003

Ans. (d) : Chloroplast and mitochondria are very similar organelles. In both organelles a double layered membrane encloses a circular DNA and protein synthesis machinery present.
Mitochondria and chloroplast are semi autonomous organelles. They are capable of self duplication.

219. Which of the following process takes place in mitochondria?

(a) photolysis
(b) photophosphorylation
(c) carboxylation
(d) oxidative phosphorylation

Rajasthan PMT-2003
AMU-1995

Ans. (d) : F_1 particle have an enzymes ATP synthatase which help in the synthesis of ATP are oxidative phosphorylation occurs.
Electron transport system (ETS) occurs in the F_1 particle.
Hence, oxidative phosphorylation process present in mitochondria.

220. DNA is also present in following :

(a) Golgi body (b) Lysosome
(c) Mitochondria (d) Ribosome

Rajasthan PMT-1995

Ans. (c) : Mitochondrial DNA are circular double stranded and naked. They have own protein synthesizing machinery.

@apna_pdf

221. The cell organelles involved in energy transformation are :
(a) chloroplast and mitochondria
(b) chloroplast and leucoplast
(c) golgi body and mitochondria
(d) mitochondria and leucoplast

Rajasthan PMT-2001

Ans. (a) : The cell organelles involved in energy transformation are chloroplast and mitochondria.
- Mitochondria the process of that conversion produces energy in the form of ATP. because the phosphate is a high energy bond and provides energy for other reaction within the cell so the mitochondria purpose is to produce that energy
- The chloroplast converts energy from sun light into chemical energy because in photosynthesis process plant chloroplast capture energy from the sun and use in to turn carbon into sugar.

Plastid without pigments found in the underground part like tuber, deep seated tissue, sex cells, Embryonic cell.

222. Which of the following statements regarding mitochondrial membrane is not correct?
(a) The outer membrane is permeable to all kinds of molecules
(b) The enzymes of the electron transfer chain are embedded in the outer membrane
(c) The inner membrane is highly convoluted forming a series of infoldings
(d) The outer membrane resembles a sieve

BCECE-2013

Ans. (b) : The enzymes of the electron transfer chain are not embedded in the outer mitochondrial membrane. Instead, they are embedded in the inner mitochondrial membrane. In inner membrane various cellular respiration and ATP production takes place, while the outer membrane serve as boundary, and allows the passage of various molecules into the inter-membrane space.

223. Mitochondria are related to
(a) prokaryotes (b) plasmids
(c) plastids (d) viruses

CG PMT-2004

Ans. (a) : mitochondria are thought to have originated from a symbiotic relationship between a prokaryotic cell and a eukaryotic cell. The prokaryotic cell was eventually engulfed by the eukaryotic cell, but it was able to survive and thrive within the eukaryotic cell. The prokaryotic cell eventually evowed into mitochondria, which are now essential organelles in eukaryotic cells.
- Plastids are also related to prokaryotes, but they are not as closely related to mitochondria as prokaryotes are.

224. Synthesis of ATP in mitochondria requires
(a) NADP (b) FMN
(c) Oxygen (d) Pyruvic acid

CMC Vellore-2011

Ans. (c) : ATP is synthesized in mitochondria by a process called oxidative phosphorylation. These process requires oxygen, which is used to generate a proton gradient across the mitochondrial membrane. This proton gradient is then used to drive the synthesis of ATP.
- NADP, FMN and pyruvic acid are involved in the process of glycolysis, which is first step in cellular respiration.

225. Quantasomes are present in
(a) Chloroplast (b) mitochondria
(c) Golgi body (d) lysosome

UPCPMT-2002
BVP-2009

Ans. (a) : Quantasomes are present in thylakoids of chloroplast. Quantasomes are photosynthetic units present on the surface of grana. Quantasomes were discovered by Park and Biggis in 1954, the term quantasome was introduced by Park and Pon in 1954.

226. The organelle which bear anthocyanins is :
(a) chloroplast (b) chromoplast
(c) vacuole (d) etioplast

Punjab MET-2004

Ans. (c) : The plant vacuoles consist of various water-soluble pigments such as carotenoids, anthocyaonin and xanthophylls etc. Anthocyanin are water-soluble pigments that are found in the vacuoles of plant cells. They give fruits and vegetables their red, purple, and blue colors.
- Chloroplasts contain chlorophyll, which is a green pigment that is used for photosynthesis.
- Chromoplasts contain other pigment such as carotenoids, which give fruits and vegetables their yellow, orange and red colors.
- Etioplasts are colorless plastids that are found in etiolated plants, which are plants that have been grown in dark.

227. Which of the following is not a function of vacuole in plant cell ?
(a) Storage
(b) Waste disposal
(c) Cell elongation and protection
(d) Production of hydrogen peroxide

Punjab MET-2005

Ans. (d) : Cell vacuoles contain water and dissolved substances. vacuoles serve as a temporary store house for many of the cells solutes and macromolecules, including ions, sugars, amino acids, proteins carbohydrates.
H_2O_2 – as a value added chemical, can be produced by a two-electron reaction in the process of water cracking in photochemical cells.

228. Small particles projecting from the inner membranes and cristae of mitochondria are known as
(a) Myeloid bodies (b) Microsomes
(c) Infonnosomes (d) Oxysomes

WB JEE-2008

Ans. (d) : Small particles projecting from the inner membranes and cristae of mitochondria are knows as oxysomes.
They are also called $F_0 - F_1$ particles or ATP synthase. They play the most important role in the formation of energy for the functioning of the cell.
F_0-F_1 which has a rotational motor mechanism allowing for ATP production.

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229. ATP synthesis in cell requires

(a) H^+ gradient across the membrane
(b) K^+ gradient across the membrane
(c) PO_4^{3-} gradient across the membrane
(d) Ca^{2+} gradient across the membrane

WB JEE-2015

Ans. (a) ATP synthesis in cell requires a H^+ protron gradient across the membrane. The H^+ proton gradient is created by the electron transport chain, which pumps protons out of the mitochondrial matrix. The protons then diffuses back into the matrix through ATP synthase, which uses the energy released to synthesize ATP.

K. Plastid

230. The colourless plastids that store starch are called

(a) Amyloplast (b) Elaioplast
(c) Proteinoplast (d) Pheoplast

Tripura JEE-2021
JIPMER-1996

Ans. (a) : The colorless plastids that store starch are called Amyloplast.

Amyloplasts as specifically a type of leucoplast that is colorless, non pigment, containing plastids. Amyloplast found in root & storage tissue and store starch polymer of glucose.

It is found in plants that is responsible for starch storage and synthesis.

Elaioplast – Elaioplast are synthesis and storage of fatty acids terpenes and other lipids.

Proteinoplast - It is found only in plant cells. It plays a crucial role in the storage of food and the metabolism of energy in the plant cells.

231. Assertion (A) : Chromatographic separation of leaf pigments shows that leaves has four different pigments

Reason (R) : Pigments absorb light at specific wavelengths and help in the process of photosynthesis. The major leaf pigments are chlorophyll-a, chlorophyll-b, xanthophylls and carotenoids.

The correct option among the following is

Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Chromatographic separation of leaf pigments shows that leaves has four different pigments.

Pigments absorb light at specific wavelengths and help in the process of photosynthesis. The major leaf pigments are chlorophyll-a, chlorophyll-b, xanthophylls and carotenoids. Paper chromatography is a analytical technique used to separate pigments according to their relative solubility and molecular weight. Chromatographic separation of the leaf pigments Chlorophyll a, (appears bright or blue-green in the chromatogram), chlorophyll b (yellow-green), Xanthophylls (yellow). Carotenoids (yellow to yellow-orange). Thus four pigment found.

232. Chl -b differs from chl -a by

(a) —CH_3 group (b) CHO group
(c) COOH group (d) CH_2OH group

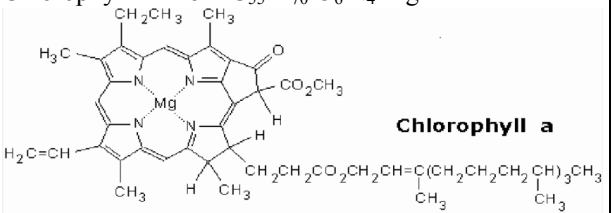
JIPMER-2019

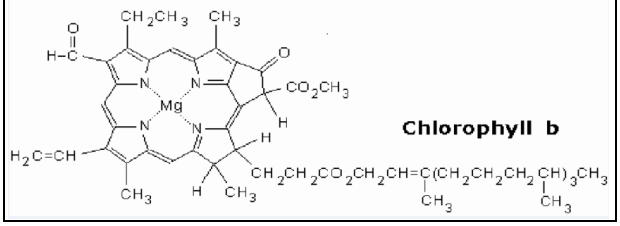
Ans. (b) : Chlorophyll-b structurally differs from chlorophyll-a by the presence of aldehyde (CHO) group at 3rd carbon in the porphyrin ring.

Chlorophyll-a possess methyl (CH_3) group in this place.

Chlorophyll a = $C_{55}\ H_{72}\ O_5\ N_4\ Mg$

Chlorophyll b = $C_{55}\ H_{70}\ O_6\ N_4\ Mg$





233. Match the Column I and II

(i) Etioplast	**(A) Storage of starch**
(ii) Aleuroplast	**(B) Storage of fat**
(iii) Amyloplast	**(C) Storage of protein**
(iv) Chromoplast	**(D) Colored pigments**

(a) i– A, ii – C, iii – D, iv – B
(b) i– D, ii – D, iii – C, iv – A
(c) i– D, ii – C, iii – D, iv – A
(d) i– B, ii – C, iii – A, iv – D

AIIMS-25.05.2019 Shift-I

Ans. (d) : Leucoplasts are colourless plastids that contain stored nutrients.

They are of 3 types :-

(1) **Etioplast** :- Stores oils and fats.

Ex.:- Endosperm cells of castor seed.

(2) Aleuroplast :- Stores proteins.

Ex.:- Aleurone cells of maize grain.

(3) Amyloplast:- Stores starch.

Ex.:- Potato tubers. wheat grains.

- **Chromoplast:-** Contains carotene and xanthophylls. They impart a specific colour of flowers and fruits and help in pollination and dispersal of seeds.
- Chloroplasts are plastids that contain chlorophyll and carotenoid pigments that are necessary for photosynthesis.

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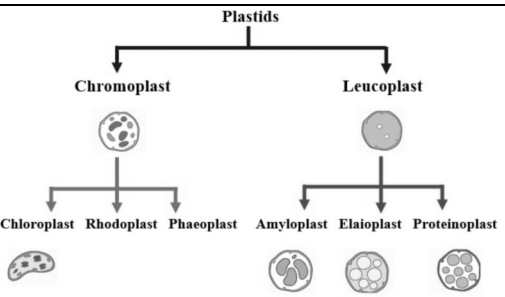

234. Match the following lists :

List-I	List-II
A. Amyloplasts	I. Colour less plastids of varied shapes, sizes with stored nutrients
B. Elaioplasts	II. Store proteins
C. Aleuroplasts	III. Store carbohydrates (Starch)
D. Leucoplasts	IV. Store oils and fats
	V. Store carotene and xanthophylls

The correct match is

	A	B	C	D
(a)	III	IV	II	I
(b)	IV	III	I	II
(c)	II	I	V	III
(d)	III	IV	V	II

TS EAMCET-08.05.2019 Shift-I

Ans. (a) : Amyloplasts They are contain the starch as potato tuber, wheat grains.
Elaioplasts or loeosomes – They stored the fat or lipids endosperm cells caster seed .
Leucoplast–Colourless plastids without pigment found in the underground part like tuber.
Aleuroplast–They are store in proteins as maize, beat Rise.

235. Cup-shaped chloroplast is the characteristic of

(a) Chlamydomonas (b) Spirogyra
(c) Ulothrix (d) Chlorella

Tripura JEE-2019

Ans. (a) : Cup -shaped chloroplast is the characteristic of chlamydomonas. It is a genus of green algae consisting of about 150 species of unicellular flagellates, found in stagnant water and on damp soil, in freshwater and even in snow algae.

- **Spirogyra** - They are free - floating green algae present in freshwater habitats such as ponds, lakes etc. Chloroplast is spiral and ribbon shaped
- **Chlorella** - It is a genus of about thirteen species of single called green algae of the division chlorophyta.
- **Ulothrix** - It is generally found in fresh water and marine water. They thrive in the low temperature of spring and winter. The shape of chloroplast in ulothrix is girdle shaped.

236. Plastids contain which one of the following structures ?

(a) Microtubule (b) Thylakoid
(c) Cristae (d) Plasmodesmata

Tripura JEE-2018

Ans. (b) : Thylakoids are found commonly in Plastids. Plastids are double membrane bound organelles inside plants and algae which are primarily responsible for activities related to manufactures and storage of important chemical compounds.

- **Microtubule:** They are microscopic, hollow tubes made of alpha and beta tubline that are a part of the cells's cytoskeleton.
- **Cristae :** They are sub-compartments of the inner membrane of mitochcondria and are essential to mitochondrial function.
- **Plasmodesmata :** Plasmodesmata are the micro scopic channels that transverse the cell walls of plant cells and allow transport and communication between the adjacent cells.

237. Assertion (A): In all green plants, each cell shows one chloroplast
Reason (R): The ratio between the number of chloroplasts and the number of cells in chlamydomonas is 1 : 1

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-25.04.2018 Shift-I

Ans. (d) : Chloroplast are present in the cells of all green tissues of plants and algae chloroplast are also found in photosynthesis tissue that do not appear green. Such as the brown blades of giant kelp or the red leaves of certain plants.
In higher plant 20-40 chloroplast each cell have been reported but in number of also variable lower plant like Chlamydomonas, ulothrix, chlorella single chloroplast are found.
Zygnema – 2 chloroplast per cell.
Spirogyra 2-14 chloroplast per cell.

238. Chromoplast is found in:

(a) Stem
(b) Leaf
(c) Root
(d) Fruit and corolla of flower

Rajasthan PMT-1996

Ans. (d) : Chromoplast is found in fruit and corolla of flower. They are pigmented plastids. They impart a variety of colours to plant cells. They contain carotenoids. They lack chlorophyll. The transition of chloroplasts to chromoplasts is much evident in fruit ripening. There is an extensive synthesis of carotenoids. Chromoplast development is irreversible in plant like pepper and tomato light, temperature and nutrients are important factors in the formation of chromoplasts.

239. Anthocyanin pigment is found in:

(a) Cell sap (b) Chloroplast
(c) Mitochondria (d) None of the above

Rajasthan PMT-1996

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Ans. (a) : Anthocyanins pigments are found in cell sap. They are found abundant in plants, including red-purplish or red to blue-colored fruits, leaves flowers roots and grains.

Cell sap : It is the liquid inside the large central vacuole of a plant cell. It serves as the storage of materials and provides mechanical support, especially in non-woody plants.

240. Which of the following pigment is responsible for flowering and germination?

(a) Phytohormone (b) Phytochrome
(c) Photochrome (d) Photohormone

UP CPMT-2010

Ans. (b) : Phytochrome pigment is responsible for flowering and germination. They are class of photorecepter in plants bacteria, and fungi used to detect light.

- **Phytohormone** are known as plants hormones they are chemicals produced by plants that regulate their growth, development reproductive processes longevity and even death.The role of phytoharmones in controls of plant development and architectures.

241. Plastocyanin contains

(a) copper (b) iron
(c) calcium (d) potassium

UP CPMT-2010

Ans. (a) : Plastocyanin is a copper containing protein that mediates electron transfer. It is found in a variety of plants , where it participates in photosynthesis the protein is a prototype of the blue copper proteins plastocyanin is the long range electron carrier in plants.

- **Iron** is an essential mineral that helps the body transport oxygen throughout the body. It is also involved in the production of Red blood cells.
- **Potassium –** It is an essential mineral that is needed by all tissues in the body.
- **Calcium –** It is a mineral most often associated with healthy bones and teeth, although is also plays an important role is blood clotting.

242. Which one of the following is not a plastid?

(a) Mitoplast (b) chromoplast
(c) chloroplast (d) Leucoplast

DUMET-2008

Ans. (a) :A mitoplast is a mitochondrion that has had its outer membrane removed, leaving the inner membrane and matrix intact.(Mitochondria-outer membrane = mitoplast).

Chromoplast, chloroplast and leucoplast are example of plastid

- **Chloroplast:** A chloroplast is a type of membrane bound organelle known as a plastid that conducts photosynthesis mostly in plant and algal cells.
- **Chromoplast:** It is pigmented plastids. It imparts a variety of colours to plant cells.
- **Leucoplast :** It is colourless cell organelles that store reserve food for later uses.

243. Abcisic acid is primarily synthesized in

(a) Lysosomes (b) Golgi complex
(c) chloroplast (d) ribosomes

J&K CET-2009

Ans. (c) : Abcisic acid is primarily synthesized in chloroplast. It is a plant hormone that regulates numerous aspects of plant growth, development and stress responses.

- **Lysosomes** are a single unit membrane bound structure found in cells. It contains hydrolytic enzymes which is helps in cellular digestion.
- **Ribosome:** It is an intercellular structure made of both RNA and Protein, and it is the site of protein synthesis in the cell.
- **Golgi complex :** It is also called Golgibody. It prepares proteins and fat molecules for use in other places inside and outside the cell.

244. From the following, select the statement that is true.

(a) All cells have a cell wall
(b) Animals cells contain microtubules but plant cells do not contain microtubules
(c) The Golgi apparatus is found only in animal cells.
(d) Chloroplasts are found in plant cells but not in prokaryotic or animal cells

J&K CET-2012

Ans. (d) : Chloroplasts are found in plant cells but not in prokaryotic or animal cells.

- Animal cell do not bounded with cell wall.
- Both animal and plant cells contain microtubules.
- The Golgi apparatus is found in both plant and animal cells.

245. Camouflage of chamaeleon is associated with

(a) chromosome (b) chromomere
(c) chromoplast (d) chromatophore

AIIMS-1995
AMU-2011

Ans. (d) : Chromatophores are referred to as pigment containing cells or groups of cells that produce colour. They are present in various creatures including fish, amphibian, reptiles, crabs and cephalopods. Chameleons have the ability to change color because they have special skin cells called chromatophores.. These are different kinds of chromatophores. Some contains yellow red or black pigments and some contain transparent crystals which reflect light and can produce blue or which reflect light and can produce blue or white colours. Chameleon have multiple layers of these chromatophores.

246. Aleuroplasts in a cell stores

(a) starch (b) oil
(c) protein (d) nutrients

AMU-2010

Ans. (c) : Aleuroplasts in a cell stores protein. They are colourless plastids. It is one of the forms of leucoplast in plant cells that is responsible for the storage proteins plant cells particularly seeds contain aleuroplasts.

- **Starch:** It is found in plants. It contains sugar molecules joined chemically. It is found high level in foods such as potatoes, rice, corn and wheat. Amyloplasts store carbohydrate (starch).
- **Nutrients :** They are chemicals substances found in every living thing on earth. They are used in every process of an organism's body.

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247. The chemical formula of chlorohyll-b is:

(a) $C_{55}H_{72}NN_5Mg$ (b) $C_5H_{72}O_5N_4Mg$
(c) $C_{55}H_{70}O_6N_4Mg$ (d) $C_{55}H_{70}O_5N_5Mg$

HP CET-2013

Ans. (c) : The chemical formula of chlorophyll-b is $C_{55}H_{70}O_6N_4Mg$

248. The largest cell organelle is:

(a) mitochondria (b) chloroplast
(c) Golgi body (d) chromosome

Uttarakhand-2005
AMU -1998.

Ans. (b) : The largest cell organelle is chloroplast. It is responsible for photosynthesis.

- **Golgi body:** It is involved in the transport of lipids around the cell.
- **Mitochondria:** 2nd largest organelle, it makes energy available to the cell. they are also called powerhouse of the cell.
- **Chromosomes:** Chromosomes are thread-like structure located inside the nucleus of animal and plant cells.

249. Which of the following reaction does not take place in the cell organelle, that is referred to as "Power house of the cell" ?

(a) Glycine decarboxylation
(b) Glyceraldehyde 3-phosphate de hydrogenation
(c) Fumaric acid hydration
(d) Cytochrome oxidation

AP EAMCET-2003

Ans. (b) : Glyceraldehyde 3-Phosphate dehydrogenation does not take place in the cell organelle that is referred to as "power house of the cell" It is found in cytoplasm during glycolysis other three reactions take place in mitochondria.

- Cytochrome oxidation is the process by which cytochrome oxidase, the last enzyme in the electron transport chain, reduces molecular oxygen to water. This process help in the translocation of proton across the mitochondrial membrane, which creates a proton gradient that is used synthesize ATP.
- **Glycine decarboxylation** : It is a metabolic oncogene that links glycine metabolism with tumerigenesis.
- **Fumaric acid hydration** : The monoanion of fumaric acid has been shown to undergo hydration uncatalyzed by any external agents, while crotonic acid anion does not undergo such a reaction.

250. Which one type of plastids contain oil as reserve food?

(a) Elaioplast (b) Amyloplast
(c) Chloroplast (d) Chromoplast

VMMC-2014
AMU-2002

Ans. (a) : Elaioplast contains oil as reserve food. They are lipids storage plastids. Elaioplast is the leucoplast specialized in storing lipids, proteins, fats and oil. Leucoplasts are colourless non-photosynthetic plastids.

- **Amyloplasts** are double enveloped organelles responsible for starch storage and synthesis.
- **Chloroplasts** contain chlorophyll, which is a green pigment that is used for photosynthesis.
- **Chromoplasts** contain other pigment such as caretenoids, which give fruits and vegetables their yellow, orange and red colors.

251. Plastids of an etiolated plant possess

(a) phycobilins
(b) carotenoids and xanthophyll
(c) chlorophylloid and carotenoids
(d) chlorophyll and carotenes

AMU-2008
VMMC-2008

Ans. (c) : Plastids of an etiolated plant possess chlorophylloid and carotenoids. Etiolation of a plant is the elongation and weakening of the plant stem and development of yellowish white color in its leaves.

- **Phycobilins** : Phycobilins are water soluble pigments that are fairly joined to a protein
- **Carotenoids**: The carotenoids are an important group of pigments in plants where they function as accessory light- harvesting pigments in photosynthesis.
- **Xanthophyll** : They are photochemical cooling agents that deal with the active state of chlorophyll or triplet chlorophyll.

252. Which of the following organelles contain circular DNA?

(a) Peroxisomes and Mitochondria
(b) Mitochondria and Golgi complex
(c) Chloroplasts and Lysosomes
(d) Mitochndria and Chloroplast

Ans. (d) : Mitochondria and Chloroplast organelles contain circular DNA. Mitochondria and chloroplast have endo-symbiotic origin prokaryotic type. So have ds circular DNA as that of prokaryotes.

Peroxisomes - Peroxisomes are abundant in the liver where they produce bile salts, cholesterol and break down fats.

253. In chloroplasts, chlorophyll is present in the

(a) outer membrane (b) inner membrane
(c) thylakoids (d) stroma

Manipal-2007
J&K CET-2000

Ans. (c) : The thylakoids are flattened sacs that are filled with a fluid called the stroma. The chlorophyll molecules are embedded in the thylakoid membrane.

Stroma - It provides nutrients to the tissue or organ and removes waste and extra fluid. Dark reaction of photosynthesis occurs in stroma of chloroplast.

254. In higher plants, the shape of the chloroplast is

(a) discoid (b) cup-shaped
(c) girdle-shaped (d) reticulate

UP CPMT-2013
DUMET-2009

Ans. (a) : The shape of the chloroplast in higher plants is discoid. This is due to the discoid shape has ability to increase photosynthesis efficiency by exposing more chlorophyll to light.

@apna_pdf

255. Which of the following is responsible for red colour of tomato?
(a) Chlorophyll (b) Phycoerythrin
(c) Phycocyanin (d) Lycopene
VMMC-2010
Punjab MET-2008

Ans. (d) : Most tomatoes are red when they are ripe because of the presence of lycopene, which is a phytochemical (A biologically active compound produced by plant.
Lycopene is organic compound of β-carotene. It is a natural pigments that gives some vegitables and fruits their red colour. Lycopene in tomato products could have protective effects against prostate cancer and cardiovascular disease.
Phycocyanin → It is an accessory pigments of chlorophyll. They are water soluble so, they cannot exist within the membrane.
Phycoerythrin → It is widely used as a fluorescent probe or as a colorant industries for labeling antibodies.

256. Highest number of enzymes are found in
(a) lysosome (b) chloroplast
(c) mitochondria (d) peroxisome
Haryana PMT-2008

Ans. (c) : Highest number of enzymes is found in mitochondria. Enzymes are produced by a living organism that acts as a catalyst to bring about a specific biochemical reaction (ETS, Kreb's cycle).
Peroxisome - Small vesicles single membrane organelle eukaryotic cell and main function is lipid metabolism and conversion of reactive oxygen species. It is abundant in the liver where it produces bill salts and cholesterol and break down fats.
Chloroplasts are chlorophyll containing organelles in plant cells that are involved in energy storage and synthesis of metabolic materials.
Lysosome contain hydrolytic enzymes which are acidic in nature.

257. In mitochondria, enzymes responsible for Krebs cycle are present in :
(a) matrix (b) inner membrane
(c) outer membrane (d) both (b) and (c)
Haryana PMT-2006

Ans. (a) : In mitochondria enzymes responsible for krebs cycle are present in mitochondria matrix. Matrix is a ground substance that occupies spaces, especially between the cells or that inside the organelles. It fills the space present within the mitochondria. Matrix is a specific part of the mitochondria where oxidation of organic molecules takes place.

258. Coupling factor F is found in
(a) Stroma (b) Matrix
(c) Thylakoids (d) Ribosomes
J&K CET-2007

Ans. (c) : Coupling factor F is found in thylakoids. Coupling factor F is present in chloroplast. It is embedded in the membrane and forms a trans membrane. Thylakoid is an internal system of inter connected membrane that carry out the light reactions of photosynthesis. ATPase complex is also known as the coupling factor. It is present in chloroplasts, mitochondria and the plasma membrane of bacteria.

259. Which of the following has their own DNA ?
(a) Ribosome (b) Dictyosome
(c) Microsome (d) Chloroplast
Rajasthan PMT-2000

Ans. (d) : Chloroplast have their own DNA, RNA and Proteins. They can multiply when the energy needs of a cells increases.
Not only chloroplast but mitchondria has its own DNA. That is why they are called semi autonomous.

260. Aleuroplast is a type of leucoplasts which stores
(a) lipid (b) carbohydrates
(c) starch (d) protein
CMC Ludhiana -2013

Ans. (d) : Aleuroplast is a type of leucoplast which stores protein. It is one of the forms of leucoplast in plant cells that is responsible for the storage proteins e.g. aleurone cell of seed.
Lipid - It is part of cells membranes about 50% of membrane mass and helps control what goes in and out of cells. Elaioplast store lipids.
Carbohydrates (starch) are stored by amyloplast.

261. Elaioplast store
(a) starch (b) proteins
(c) fats (d) essential amino acids
CMC Ludhiana-2012
DUMET - 2011

Ans. (c) : Elaioplast store fats and oil. They are generation and storage of fatty acids, terpenes and other lipids. It is a leucoplast that is primarily involved in storing fats.

262. Proteinaceous nature of enzyme was suggested by :
(a) Sumner (b) Kuhne
(c) E. Buchner (d) Northrop
BCECE-2003

Ans. (a) : Proteinaceous nature of enzyme was suggested by Sumner in 1926 who found pure urease and crystalline.
Northrop produce pure crystals of pepsin, trypsin and chymotrypsin enzymes.
E. Buchner fermented sugar in laboratory without living cells. kuhne coined the term enzyme in 1878.

263. Thylakoids are present in
(a) nucleus (b) mitochondria
(c) chloroplast (d) cytoplasm
AMU-2002

Ans. (c) : Thylakoids are membrane bound compartments inside chloroplasts. Thylakoide is the site of photochemical or light - dependent reactions of photosynthesis. Chlorophyll present in the thylakoid membrane absorbs energy from the sunlight and is involved in the formation of ATP. In thylakoid membranes, chlorophyll pigments are found in packets called quantasomes.

264. Grana are present inside the
(a) mitochondria (b) chloroplast
(c) endoplasmic reticulum (d) ribosome
AMU-2001

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Ans. (b) : Grana is present inside the chloroplast. The grana and stroma are the parts of the which is also known as the kitchen of the cell. It is a double membraned cell organelle.

Chloroplast the light reaction take in grana and dark reaction take place in stroma.

265. Which one of the following cellular parts is correctly described

(a) Ribosomes - those on chloroplasts are larger (80s) while those in the cytoplasm are smaller (70s

(b) Lysosomes-optimally active at a pH of about 8.5

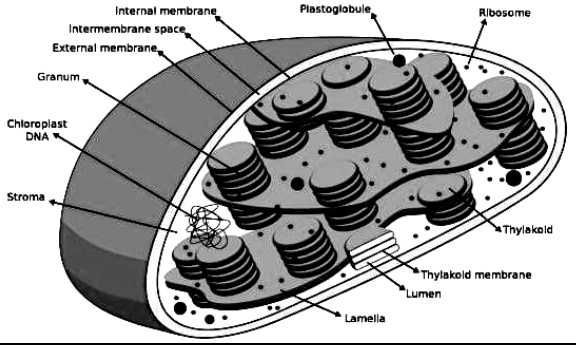
(c) Thylakoids-flattened membranous sacs forming the grana of chloroplasts

(d) Centrioles - sites for active RNA synthesis

AIPMT (Mains)-2012

Ans. (c) : The structure that are fromed by stacking of organised flattened membranous sacs (Thylakoids) in the chloroplast of grana an resembles a stack of coins.

- It is made up of three layers like structrue in thylakoid system which is surrounded by the stroma and grana.
- Chlorophyll and other photosynthetic pigments are situated in the theylakoid membrane which are site for the light dependent reaction of photosynthesis.
- Centriole are a membranous hallow micro-cylinders occurs in pair and play Important role in cell division.
- Ribosome in chloroplast are 70s type while those cytoplasm in eukaryotic it is of 80s type.
- The enzyme of lysosome (called suicidal bag) function at acidic pH (pH 4.5-5.0).



266. Select the wrong statement from the following:

(a) The chloroplasts are generally much larger than mitochondria

(b) Both chloroplasts and mitochondria contain an inner and an outer membrane

(c) Both chloroplasts and mitochondria have an internal compartment, the thylakoid space bounded by the thylakoid membrane

(d) Both chloroplasts and mitochondria contain DNA

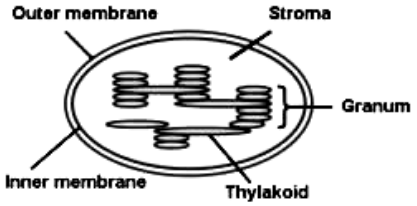
AIPMT-2007

Ans. (c) : Chloroplasts and mitochondria have an internal compartment.

- The thylakoid space, bounded by the thylakoid lumen membrane in chloroplast only.
- Chloroplast is largest organelle of cell and mitochondria is 2nd largest organelles of cell.

Both mitochondria and chloroplast have inner and outer membrane.

Both mitochondria and chloroplast contain DNA and RNA thus they are called as semiautonomous organelle.



267. Which factor is responsible for inhibition of enzymatic process during feed back:

(a) Substrate (b) Enzymes

(c) End product (d) Temperature

AIPMT-2000

Ans. (c) : Feedback inhibition or **end product** is the inhibition of the activity of an enzyme catalysing some early reactions of the series by the end product of the metabolic pathway. For example a substrate A is converted into a product F through B, C, D and E intermediate products. As the concentration of end product F increases, it diffuses to allosteric enzyme (E), causing a reduced synthesis of the product B which in turn lowers the rate of enzymatic reactions in rest of the pathway.

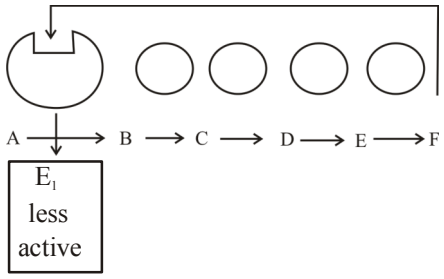


Fig: Feedback inhibition: Product inhibits the action of enzyme E

268. Which of the following type of plastids does not contain stored food material?

(a) Amyloplasts (b) Chromoplasts

(c) Elaioplasts (d) Aleuroplasts

Assam CEE-2014

NEET (Karnataka)-2013

Ans. (b) : Chromoplasts are yellow or reddish in colour because of the presence of carotenoid pigments.

- **Chromoplasts** are formed either from leucoplasts or chloroplasts. Chromoplasts provide colour to many flowers for attracting pollinating insects. They provide bright red or orange colour to fruits for attracting animals for dispersal.Chromoplast is responsible for the colour not for food storage.
- **Amyloplasts** e.g. potato tuber,

  Elaioplasts or lipidoplasts or oleoplasts are colourless plastids which store lipids e.g endosperm cells of castor seed .
- **Aleuroplasts** or proteioplasts or proteinoplasts are protein storing plastids, eg. aleurone cells of maize grain.

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269. A pigment concerned with both floral induction and seed germination is :

(a) anthocyanin (b) phytochrome
(c) phycocyanin (d) xanthophylls

BVP-2006

Ans. (b) :Phytochrome is a kind of pigments which absorbs red and for red light and its light absorbing region in closely associated with protein. Pytochrome exists in two forms.

- The Pr form- It absorbs red light and gets converted into its active form i.e. pfr form.
- The Pfr form- It absorbs for red light and gets converted into Pr form

Ativity of phytochrome.

Elongation of leaf, stem and petiole, germination of pollen, fern spores, and seed etc.

270. A pigment, which absorbs red and far red light, is

(a) cytochrome (b) phytochrome
(c) xanthophyll (d) carotene.

AIIMS-1994

Ans. (b) : Phytochrome occurs in two form Pr and Pfr an absorbs red and for red light.

Phytochrome is a light sensitive pigment in plants and some bacteria and fungi. It exist in two inter convertible form. Pr and Pfr. If Pfr absorbs for red light of 730 nm wavelength when it absorbs for red light convert to its original form. Pr Thus Pfr is a active form of phytochrome which inhibited flowering.

carotene - These are the hydrocarbon.

Insoluble in water and soluble in organic solvent.

xanthophylls – is insoluble in water as the long hydrocorban tail attached to the porphyrin ring makes then fat soluble.

271. Analyze the following pairs and identify the correct options given

(A) Chromoplasts	**Contain pigments other than chlorophyll**
(B) Leucoplasts	**Devoid of any pigments**
(C) Amyloplasts	**Store proteins**
(D) Alueroplasts	**Store oils and fats**
(E) Elaioplasts	**Store carbohydrates**

(a) B and C are correct
(b) C and D are correct
(c) D and E are correct
(d) A and B are correct
(e) A, B and C are correct

Kerala PMT-2009

Ans. (d) : Chromoplasts Contain pigment other than chlorophyll chromoplasts coloured plastids other than green may we orange, red, blue, yellow.

Leucoplast - Are colourless plastids without pigments found in the underground part like tuber, etc.

Amyloplast – Starch they store the starch as potato tuber.

Alueroplasts – Store protein.

Elaioplast – They store the fats and oil.

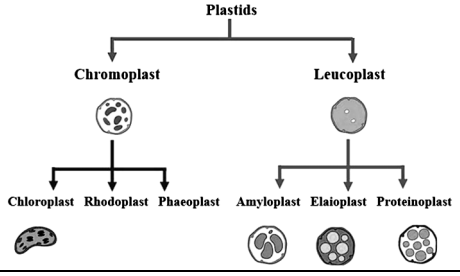
272. What is common between chloroplasts, chromoplasts and leucoplasts ?

(a) Presence of pigments
(b) Possession of thylakoids and grana
(c) Storage of starch, proteins and lipids
(d) Ability to multiply by a fission-like process

AIIMS-2006

Ans. (d) : Chloroplast, Chromoplast and Leucoplast are plastids and have the ability to multiply by a fission like process before they are fully mature.

- **Leucoplast** is colorless plastid, involved in the storage of starch lipid and proteins. (i) e.g underground root and stem.
- **Chloroplast** are green colored plastids containing thylakoids and photosynthetic pigment chlorophyll. They are involved in the photosynthetic production of carbohydrates. (ii) In higher plant chloroplast may be ovoid, spheroid or dish-shaped but mostly they are lance shaped.
- **Chromoplast** are plastids responsible for pigment synthesis. They give distinctive to different fruits, flowers and ageing leaves in plants.

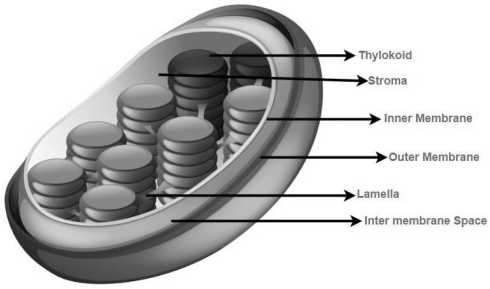


273. Many cells function properly and divide mitotically even though they do not have

(a) plasma membrane (b) cytoskeleton
(c) mitochondria (d) plastids.

AIIMS-2005

Ans. (d) : Plastids are specific for plant cell and absent in animal cells. Main function of plastids is, synthesis and storage of food. Therefore mitosis will occur even in the absence of plastids. Hence, cell can function properly and divide mitotically even in the presence or absence of plastids.



274. All types of plastids possess essentially the same structure because they:

(a) Perform the same function
(b) Store food materials like starch, fat and protein
(c) Occur in aerial parts
(d) Can transform from one form to another.

AIPMT-1992

@apna_pdf

Ans. (d) : All the plastids have a common origin and one type of plastid change into another plastids considered as sac like organelles, generally involved in the formation or storage of food.
Schimper divided the plastic into three part according to presence or absence of their pigment.
1. Chloroplasts (chloro - green + plast - living)
2. Leucoplasts (Leukos - white + plast - living)
3. Chromoplasts (chromo - colour + plast - living)

275. Pyrenoids are centre of
(a) Fat storage (b) Starch storage
(c) Protein formation (d) Enzyme formation
CMC Vellore-2012

Ans. (b) : Pyrenoids are found in chloroplast of algae and bryophyta, center of starch storage. The centers of pyrenoids of proteinaceous and they are responsible for the formation of starch.
Fat storage – Elioplast as Tuberose
Protein storage – Aleurone cell maize grain endosperm cell of caster.

276. Elementary particles occur:
(a) in mitrochondria (b) in the cytoplasm
(c) in chloroplast (d) in all of these
JIPMER-1996

Ans. (a) : Elementary particle occur inner mitochondrial membrane bears subunits minute regularly spaced particles known as the inner membrane subunits or elementary particles (FP) or oxysomes.
Elementary particles have three part a rounded head piece or F_1 subunit, a short stalk, a base piece or F_o subunit located in the inner membrane.
These particles are present in matrix side of mitochondria inner membrane.

277. Which one of the following is not found in animal cells?
(a) Nucleus (b) Golgi bodies
(c) Chloroplast (d) Mitochondria
CG PMT-2005

Ans. (c) : Chloroplast mostly occurs in a plant and certain algae that is the size of photosynthesis cell of the leaves. Sepals of the flower pericarp of unripe fruit also have chloroplast and other hand nucleus, Golgi body and mitochondria mostly found in both cells.

278. In which, plastids are not found?
(a) Blue-green algae (b) Bacteria
(c) Fungi (d) All of the above
CG PMT-2005

Ans. (d) : Plastids are the characteristic feature of photosynthetic eukaryotes.
Plastids are double membrane organelle found in the cells of plant and algae. But not found in prokaryotes such and bacteria, blue green algae and saprophytic fungi.

279. Example of water soluble plant pigment is
(a) chlorophyll-a (b) chlorophyll-b
(c) anthocyanin (d) xanthophylls
NEET-2016 Phase-I
WB JEE-2011

Ans. (c) : Anthocyanin is water soluble plants pigment .
The pigment are present in the vacuoles of plant cells and appear in different colour like red, blue or purple depending on the pH.
Fat soluble pigment is carotenoids and chlorophyll.
Xanthophylls is carotenoids. Chlorophylls about 10 different type - Chl -a , b, c, d, e, bacterial chlorophyll.

280. Chlorophyll-b is not present in
(a) green algae (b) bryophytes
(c) Spirogyra (d) blue-green algae
DUMET-2006

Ans. (d) : It is found all like green plant in green Algae bryophytes, pterdophytes, Gymnosperm and Angiosperm.
except diatoms, red algae, brown algae and blue green algae.
Red algae (Rhodophyta) contain chlorophyll a, d and phycoerythrin.
Diatoms and Brown algae (Phaeophyceae) have pigments like chlorophyll a, c and fucoxanthin.
Blue green algae (Cyanobateria) contain chlorophyll a, carotenoids and phycobiliproteins.

281. Mesosomes are analogous to:
(a) chloroplast (b) mitochondria
(c) lysosome (d) none of these
Rajasthan PMT-1997

Ans. (b) : Mesosomes are characteristic structure of bacterial cell. The mesosomes participates in energy production, DNA replication nucleoli separation, cell division, nitrogen fixation etc. and analogous to eukaryotes of mitochondria.
Lysosome – are involve in intracellular digestion lysosome are generally found in the cytoplasm of animal cell.
Chloroplast – Are mostly occur in mesophyll cell of the leaves.

282. Showy and attractive colour of fruits is due to the presence of:
(a) chloroplasts (b) leucoplasts
(c) chromoplasts (d) amvloplasts
J&K CET-2001

Ans. (c) : Chromoplast attractive colour of fruits chromoplast plastids than the green may be orange, red blue yellow.
These are found in the ripping pericarp of fruits as tomato, chili and carrot root.
Chloroplast – These are mostly occurs is a mesophyll cell of the leaves. It gives green colour.
Leucoplast – Leucoplast are colourless plastids without pigment found in the underground parts like tuber.

283. Who discovered thylakoid?
(a) Menke (b) Nageli
(c) Hanstein (d) Schmidt
Rajasthan PMT-1995

Ans. (a) : Thylakoid discovered Menke, 1961 about 20-50 thylakoids are placed one above other like a stack of coins to form a granum or they may be unstanked called stroma thylakoids.

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Nageli and Hafmeister give Apical cell theory give according to this theory there is single tetrahedral apical cell in the root apex.
Schmidt – Tunica corpus concept. According 1924 to this concept there are two portion in shoot apex tunica and carpus.
Hanstein – 1868- Histogen concept According to this concept there are group of initials or histogen in the apical meristem plerome, priblem and dermatogen respectively.

284. Fat storing granules are
(a) elaioplast (b) amyloplast
(c) aleuroplast (d) none of these
DUMET-2007

Ans. (a) : Elaioplast store the fat and lipid granules such as endosperm custur seed.
Amyloplast – Store the starch
Aleuroplast – Store the protein.

285. Which of the following absent in chloroplast ?
(a) DNA (b) Carotene
(c) Anthocyanin (d) Xanthophyll
BVP-2011

Ans. (c) : Anthocyanin water soluble pigment absent in chloroplast found in fruits, leaves, flowers roots and grains.
Carotene - these are hydrocarbon insoluble in water and soluble in organic solvent they trap the energy from the sun and then transfer it to the chlorophyll molecule therefore called necessary pigment.
Xanthophyll are yellow pigments that are one of the important divisions of the carotenoid group.
DNA (deoxyribonucleic acid) is the molecule that carries the genetic information.

286. The ATP synthase of chloroplasts is like that of
(a) peroxisomes (b) golgi body
(c) micro somes (d) mitochondria
Punjab MET-2005

Ans. (d) : The ATP synthase of chloroplast is like that of mitochondria enzyme ATP synthase utilized when movement of protons than ADP to ATP.
Perxysomes are round to oval bodies that have a diameter ranging between o.1 to 0.5 pm.
Golgi bodies :- complex functions primarily as a processing plant where proteins nearly synthesized in endoplasmic reticulum in specific ways.

L. Ribosome and Cytoskeleton

287. Ribosomes of bacteria, mitochondria prokaryotes and chloroplasts are of:
(a) 30S type (b) 70S type
(c) 80S type (d) 50S type
MHT CET-08.10.2020 Shift-I
Tripura JEE-2017
BCECE-2015 / JCECE- 2010
AMU-2009 / Punjab MET – 2008
J&K CET-2007, 2002
JIPMER-1997, 2000

Ans. (b) : Ribosome of bacteria, mitochondria Prokaryotes and chloroplasts are of 70S type.

288. Protein synthesis takes place in
(a) ribosomes (b) chloroplasts
(c) mitochondria (d) golgi bodies
Punjab MET-2010
Uttarakhand PMT-2008
Manipal – 2008
DUMET-2003,2008
BVP - 2007, 2001
UP CPMT-2007
Rajasthan PMT-1999, 2006
CGPMT - 2006
BHU PMT-2004
AIPMT-1992

Ans. (a) : Protein synthesis takes place in ribosomes with the help of mRNA and tRNA. Ribosomes are large ribonucleo proteins contains RNA's & protein. It can translate genetic information stored in mRNA into polypeptides & thus synthesize Proteins cell active in Protein synthesis take place in ribosomes
The process by which genetic information is transferred from the nucleus to the ribosome is called transcription.
Mitochondria and chloroplast contain double layered membrane. Golgi body and Lysosome contain unit membrane.

289. Which of the following pair lack the unit membrane?
(a) Nucleus and ER
(b) Mitochondria and chloroplast
(c) Ribosome and nucleolus
(d) Golgi body and lysosome
AIIMS-25.05.2019 Shift-II
J&K CET-2011, 2006, 2005
DUMET-2003
JCECE-2003
Rajasthan PMT-1995, 2002

Ans. (c) : Ribosome and nucleolus are cell organelles that lack the unit membrane. Ribosome can be Present in the cytoplasm and also line the rough endoplasmic reticulum's membranes. It is made up of ribosomal proteins and RNA.

290. Ribosomes are made up of
(a) t RNA and protein (b) r RNA and protein
(c) m RNA and protein (d) m RNA and DNA
KVPY (SA) – 2018
UPCPMT – 2004
BVP - 2002 / AMU-1999,1995

Ans. (b) : Ribosome are made up of protein and RNA. The ribosome is a cytoplasmic structure that is minute and sphere shaped. It is composed of protein and ribonucleic acid (RNA).
It has 2 subunits – The small ribosomal subunits. Which reads the RNA, and the large subunit which joins amino acid to form polypeptide chain.

291. Which of the following cell organelle is associated with protein synthesis?
(a) Ribosome (b) Microsome
(c) Lysosome (d) Glyoxysome
J&K CET-2012 / DUMET-2008
VMMC-2002 / AMU-1998

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Ans. (a) : A cell active protein synthesis will rich in ribosome cytoplasm or found attached to the endoplasmic reticulum.
Ribosome is synthesizing the protein with the help of mRNA and tRNA.

292. Nucleolus is the site for the synthesis of
(a) DNA (b) mRNA
(c) tRNA (d) ribosomes

BVP-2008
AMU-2007
Uttarakhand PMT-2007
UP CPMT-2001

Ans. (d) : Nucleolus is the site for the synthesis of ribosome. It is the distinct structure present in the nucleus of eukaryotes cells.
tRNA - It is a small RNA molecule that in protein synthesis of tRNAs from the A site (Aminoacyl) to the P site (Peptidyl site) to E site (Exit) is coupled with movement of their associated codons in the mRNA.
It acts as an adapter molecule for linking amino acids to specific codon.
mRNA - It is a type of RNA that is necessary for protein synthesis. It is a largest RNA molecules.
DNA (deoxyribonucleic acid) is the molecule that carries the genetic information.

293. Which of the following statements are correct regarding ribosomes?
A. 70S ribosomes have two sub units 50S and 30S.
B. 80S ribosomes are present only in Eukaryotes.
C. 70S ribosomes are present both in Eukaryotes and Prokaryotes.
D. Ribosomes are not bound by any membrane.
(a) ABC (b) ABC
(c) BCD (d) ABCD

TS EAMCET-11.05.2023, Shift-II

Ans. (d) :
- 70S ribosomes have two sub units 50S and 30S.
- 80S ribosomes are present only in Eukaryotes.
- 70S ribosomes are present both in Eukaryotes and Prokaryotes.
- Ribosomes are not bound by any membrane.

294. The metal ions required for the association of the two subunits of the prokaryotic ribosomes
(a) Sodium (b) Magnesium
(c) Calcium (d) Potassium

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : Magnesium– Magnesium is essential for two vital processes as in for stabilization of the secondary structure of rRNA and binding of the ribosomal proteins to the rRNA. So the ion required to keep the two ribosomal units together during synthesis is Mg^{+}.

295. How many different proteins does the ribosome consist of ?
(a) 20 (b) 80
(c) 60 (d) 40

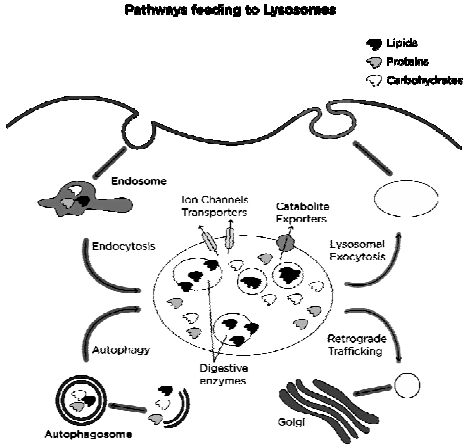
NEET (UG) 07.05.2023

Ans. (b) : Ribosome's are the sites in a cell in which protein synthesis takes place. Ribosome's are the complexes of RNA molecules and proteins. Ribosome's are visible as clusters in eukaryotic but not in prokaryotes.
• Only a few rRNA molecules are present in each ribosome, these molecules make up about half of the ribosomal mass. The remaining mass consists of 60 protein in prokaryotes cells and over 80 in eukaryotic cells.

296. If the pH in lysosomes is increased to alkaline, what will be the outcome?
(a) Hydrolytic enzymes will function more efficiently
(b) Hydrolytic enzymes will become inactive
(c) Lysosomal enzymes will be released into the cytoplasm
(d) Lysosomal enzymes will be more active

NEET (Re-Exam)-04.09.2022

Ans. (b) : Lysosomes maintain cellular homeostasis by generating a highly acidic environment of pH 4.5-5.0 and get deactivated at alkalin pH. It can also lead to the accumulation of undigested material in the lysosomes which can cause various diseases.



297. Assertion (A): Cytoskeleton in eukaryotic cells is made up of a network of filamentous lipids and polysaccharide structure.
Reason (R): Cytoskeleton is composed of microfilaments. intermediate filaments and microtubules.
The correct options among the following is
(a) (A) is true.(R) is true and (R) is the correct explanation for (A)
(b) (A) is true. (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-31.07.2022 Shift-I

Ans. (d) : Cytoskeleton are fundamental components of all eukaryotic cell which consist of filamentous protein and they are three type.
1- Intermediates filament
2- Actin filament
3- Micro tubulen

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Intermediate filament are the fast skeleton in nature provide cytoplasm mechanical strain. Actin filaments and micro filaments are not only cytoskeleton but also responsible for movement of cytoplasm and organelle.
Microtubules are made of protein called tubulin.
Micro filament consist of actin protein. It is mainly found in plasmamembrane and extant for the movement of cell.

198. Which of the following structure is found in all prokaryotic cells?
(a) Mitochondria (b) Golgi complex
(c) Ribosomes (d) Lysosomes

TS EAMCET-31.07.2022 Shift-I

Ans. (c): Prokaryotic organisms lacks the nucleus and nuclear associated organelles like they lack nuclear membrane, mitochondrion, lysosomes, golgi body, microbodies, vacuoles etc. But they are present in eukaryotic cells. Ribosomes are non-membrane bound organelles present in prokaryotes as well as eukaryotes. Bacterial Ribosomes have half of amount of r RNA & few ribosomal proteins. mRNA is translated by Ribosomes into protein.

299. Peptide synthesis inside a cell takes place in ————
(a) Chloroplast (b) Mitochondria
(c) Chromoplast (d) Ribosomes

AP EAMCET-03.09.2021 Shift-I

Ans. (d) : Peptide systhesis inside a cell takes place in ribosomes by transcription and translation. The translation is take place cytoplasm of the cell.

300. Ribosomes were first observed by_____
(a) Robert Hook (b) K.R. Porter
(c) George Palade (d) Robert Brown

AIPMT-1991
AP EAPCET-07.09.2021 Shift-I

Ans. (c) : In 1955 George E. Palade discovered ribosomes described by using an election microscopes. It is small particles in the cytoplasm that preferentially associated with the endoplasmic reticulum membrane.

301. Polysome is formed by:
(a) a ribosome with several subunits
(b) ribosomes attached to each other in a linear arrangement
(c) several ribosomes attached to a single mRNA
(d) many ribosomes attached to a strand of endoplasmic reticulum

MHT CET-07.10.2020 Shift-I
BHU PMT (Screening)-2010
AIPMT-2008

Ans. (c) : Polysome is formed by several ribosomes attached to a single mRNA. It consists of a complex of an mRNA molecule and two or more ribosomes that act to translate mRNA instructions into polypeptides.

302. Which of the following elements helps in maintaining the structure of ribosomes?
(a) Molybdenum (b) Magnesium
(c) Zinc (d) Copper

NEET-2020 Phase-II

Ans. (b) : Magnesium help to stabilizer the interaction between the rRNA and proteins in the ribosomal subunit and also help to maintain the conformation of the decoding center, where the codon-anticodon pairing occurs. Magnesium ion also involved in translation like tRNA selection and GTP hydrolysis and maintaining the structure of ribosome.

303. Which is the correct sequence of modification and transport of secretary vesicles?
(a) RER → Cell membrane → Secretary vesicles → Golgi body
(b) RER → Secretary vesicles → Golgi body→ Cell membrane
(c) RER → Golgi body → Secretary vesicles → Cell membrane
(d) SER → Golgi body → Cell membrane → Secretary vesicles

JIPMER-2019

Ans. (c) : The correct sequence of modification and transport of secretary vesicles is –
RER → Golgi body → Secretary vesicles → Cell membrane

304. Choose the functions of Cytoskeleton
I. Formation of cell plate during cell division
II. Mechanical support
III. Cell motility
IV. Intercellular transport
The correct answer is
Options:
(a) I, III (b) II, IV
(c) III, IV (d) II, III

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : Cytoskeletal are extremely minute, fibrous and tubular structure which forms the structural frame work inside the cell.
Cytoskeletal structure maintain shape of the cell and its extensions, regulate orientation and distribution of cell organelles, intracellular transport and movement of cells.
They are three types-
1. Microfilaments
2. Intermediate filaments
3. Microtubules.

305. The movement of ribosome along the length of mRNA is called
(a) transcription (b) transfection
(c) transformation (d) translocation

Tripura JEE-2018

Ans. (d) : Ribosome attaches to the mRNA, reads the triplet codon and adds the amino acid to the chain and move along the mRNA to read the next codon. this movement of ribosome along the length of mRNA is called translocation.
Transcription - It is the process in which a DNA sequence is transcribed into an RNA molecule with the help of enzyme RNA polymerase.

306. Statement I Microtubules are formed only in animal cells.
Statement II Microtubules are made up of a protein called myosin.

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Choose the correct option

(a) Statement I is correct and statement II is incorrect.
(b) Statement II is correct and statement I is incorrect.
(c) Both statements are correct.
(d) Both statements are incorrect.

JIPMER-2017

Ans. (d) : Microtubules are polymers of tubulin that form part of cytoskeleton & provide shape to eukaryotic cells. They are formed by polymerization of globular proteins & tubulin into protofilaments that can associate to from hollow tube called microtubule. If is made up of proteins called tubulin.

307. A cell organelle which lacks membrane, consists of 65% rRNA, 35% proteins and helps in protein synthesis is____

(a) Nucleus (b) Nucleoid
(c) Ribosome (d) Nucleolus

MHT CET-2017

Ans. (c) : Ribosomes non-membrane organelles. Ribosome also known as Protein factory Ribosomes are 70S in Prokaryotes while 80S in eukaryotes. It has 2 Subunits small subunit and large subunit. It consists of 65% RNA and 35% protein. It helps in translation of mRNA to protein.

308. Which of the cell organelle lacks membrane

(a) Mesosome (b) Mitochondria
(c) Ribosome (d) Liposome

AIPMT (Re-Exam)-2015
WB JEE-2010
Rajasthan PMT-1996

Ans. (c) : Ribosome is the spherical structure that originate in nucleus and attached to endoplasmic reticulum.
They composed of ribonucleic acid and protein.
Liposome - It is an aqueous compartment enclosed by a bimolecular membrane typically of phospholipids, a lipid vesicles. Mesosomes are found in bacterial cells. These are similar to the eukaryotic mitochondria.

309. Tubulin protein occur in

(a) enzymes of kreb's cycle
(b) rough endoplasmic reticulum
(c) microtubules
(d) microfilaments

BVP-2010
AMU-2003

Ans. (c) : Tubulin protein occur in microtubules. A tubulin subunit contain one α-tubulin molecule and one β-tubulin. This αβ dimmer is 80-100 Å long assemble into dynamic microtubules and perform multiple important cellular function such as structural support, pathway for transport and force generation in cell division.
Microfilaments → They are implicated in the transport of various viral proteins and complexes also known as actin filament.

310. What used to described as Nissl's granules in a nerve cell are now identified as

(a) cell metabolites (b) fat granules
(c) ribosomes (d) mitochondria

Uttarakhand PMT-2007

Ans. (c) : Nissl's granules in a nerve cell are now identified as ribosome. They are found in the neurons which are nerve cells. It is specially found in nervous tissue. It is absent in sarcoplasm which is muscle cell. Their function is to synthesize the protein.

311. The primary function of intermediate filament is

(a) generate movement
(b) provide mechanical stability
(c) transport organelles within the cell
(d) stabilize microtubules against disassembly

Manipal-2011

Ans. (b) : The primary function of intermediate filament is provide mechanical stability. It contrast actin filament and micro tubules.

312. The cytoskeleton in plant cell is composed of

(a) microtubules
(b) microfilaments
(c) intermediate filaments
(d) All of the above

UP CPMT-2012

Ans. (d) : Cytoskeleton is a microscopic network of protein filament and tubules the cytoplasm.
The cytoskeleton in plant cells is composed of microtubules, microfilaments and intermediate filaments.
Microtubules - It is formed of tubulin protein which helps in chromosomal movement during cell division.
Intermediate filaments - These are cytoskeletal structure components present in the cell of vertebrates and many invertebrates.

313. In an animal cell, protein synthesis takes place

(a) only on the ribosomes protein in the cytosol
(b) only on the ribosomes attached to nuclear an envelope and endoplasmic reticulum
(c) on ribosomes present in the nucleolus as well as in cytoplasm
(d) on ribosomes present in the cytoplasm as well as in the mitochondria

AFMC-2007

Ans. (d): In an animal cell, protein synthesis takes place on ribosome present in the cytoplasm as well as in the mitochondria.
Protein are synthesized in the cytoplasm.

314. Which of the following is the site of translation of the mRNA?

(a) Nucleus (b) Nucleolus
(c) Golgi body (d) Ribosomes

J&K CET-2012

Ans. (d) : Ribosome is the site of translation of the mRNA. mRNA is a type of single stranded RNA involved in protein synthesis. The role of mRNA is carry protein information from the DNA in a cell's nucleus to the cell's cytoplasm.
Translation is the process in which proteins are produced using mRNA molecules as templates. It takes place in 3stpes initiation elongation and termination.

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315. The plane of cell wall formation in a dividing cell is determined by

(a) Golgi apparatus
(b) Microfilaments
(c) microtubules
(d) endoplasmic reticulum

J&K CET-2012

Ans. (c): Microtubule of phragmoplast spreads in the cytoplasm as the cell plate expands.
Cell plate form centre to periphery (centrifugal) cell plate forms during telophase and cytokinesis in plants.

316. Normal pH of protoplasm

(a) 7.8 (b) 6.8
(c) 5 (d) 6.5

CG PMT-2007

Ans. (b) : In plant cell pH of protoplasm is considered 6.8 protoplasm is explained as the organic and inorganic substances that constitute the living the nucleus, cytoplasm, plastids, and mitochondria of the cell.

317. The thylakoid in chloroplast are arranged as :

(a) Interconnected disc (b) interconnected sacs
(c) stacked discs (d) none

Haryana PMT-2005

Ans. (c) : The thylakoid membrane forms a network of flattened discs called thylakoid, which are frequently arranged in stacks called grana. It is arranged in stacked discs. It also involved in the water oxidation or photolysis of water resulting in the release of oxygen during photosynthesis.
On the inner face of thylakoid membrane, there are present minute granular structures called quantasomes.

318. Site of formation of ribosomal precursor or ribosomal sub-units in a cell

(a) nucleus (b) nucleolus
(c) nucleus body (d) stroma

Manipal-2013

Ans. (b) : In a cell nucleolus is the site of the formation of ribosomal precursor or ribosomal subunits. It consists of RNA and proteins which form around specific chromosomal regions.
Nucleolus is called store house of RNA and play important role in cell division.

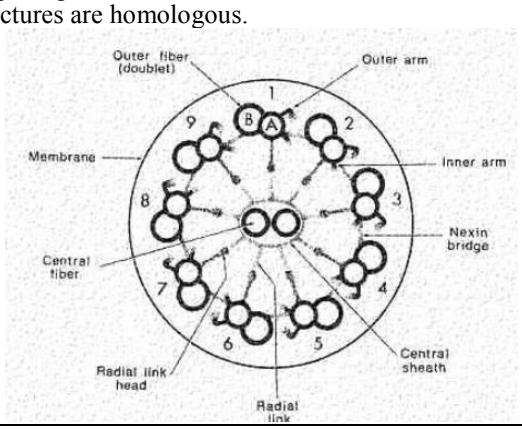
319. The usual axonemal arrangement of microtubules is

(a) 6 pairs of doublets radially arranged at periphery with a pair of centrally located microtubules
(b) 6 pairs of doublets radially arranged at periphery with a single centrally located microtubule
(c) 9 pairs of doublets radially arranged at periphery with a pair of centrally located microtubules
(d) 9 pairs of doublets radially arranged at periphery with a single centrally located microtubule

AMU-2012

Ans. (c) : The usual a axonemal arrangement of microtubules is 9 Pairs of doublets radically arranged at periphery with a pair of centrally located microtubules.

Axonemal - An axoneme, also called an axial filament axonems arise from a basal granule, the blepharoplast or kinetosome.
Blepharoplasts are derived from centrioles as the two structures are homologous.



320. Cell organelle common in Monera and Protista.

(a) Lysosome (b) Chloroplast
(c) Ribosome (d) Vacuole

VMMC-2010
AMU-2003

Ans. (c) : Cell organelle common in Monera and protista is Ribosome.
Monera - It is a biological kingdom that is made up of prokayotes. It is composed of single celled organisms that lack of a nucleus but have 70s type is Ribosome.
Protista – It is simple eukaryotic organism that are neither plants nor animals or fungi. Protista is unicellular in nature and have 80s type Ribosome.

321. Ribosomes are attached to endoplasmic reticulum through

(a) Ribophorin (b) Ribophorin I & II
(c) Peptidyl transferase (d) tRNA

J&K CET-2007

Ans. (b) : Ribosomes are attached to endoplasmic reticulum through glycoproteins know as Ribophorin I and II
Ribophorin - It is the ribosomes receptor protein or the transmembrane glycoprotein which has a dome like shape which is not protein in the smooth endoplasmic-reticulum but is situated in the rough endoplasmic reticulum.

322. Which is more important for photosynthesis?

(a) Chloroplast (b) Chlorophyll
(c) Plastid (d) Radiant energy

CG PMT-2011

Ans. (a) : Chloroplast is more important for photosynthesis. It is found in all green plant and algae. They are the food producers of plants. These are found in mesophyll cells located in the leaves of the plants. They contain a high concentration of chlorophyll that traps sunlight. This cell organelle is not present in animal cells.

323. Chromoplast contains pigment other than.

(a) Chlorophyll (b) Anthocyanin
(c) β – carotene (d) Xanthophylls

CG PMT-2010

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Ans. (d) : Chromoplast contains pigment other than chlorophyll. It is a kind of plastid. It lacks chlorophyll and has carotenoids and xanthophylls they impart specific colours to fruits and flowers.
Anthocyanin- It is water soluble vacuolar pigments that depending on their pH value. It is a red bluish in colour.

324. Which of the following helps in maintenance of cell shape
(a) Plasmalemma (b) Endoplasmic reticulum
(c) Cytoskeleton (d) Mesosome
Rajasthan PMT-2011

Ans. (c) : The cytoskeleton is a structure that helps cells maintain their shape and internal organization, and it also provides mechanical support that enables cells to carry out essential functions like division and movement there is no signal cytoskeleton component.

325. In Euglena, the proteinaceous substance that surrounds the slender part of chromatophore:
(a) pyrenophore (b) pyrenoid
(c) paramylem (d) pyrethroid
AP EAMCET-1999

Ans. (b) : In Euglena have proteinaceous substance is made up of pyrenoid that surrounds the slender part of chromatophore.
Pyrethroid-It is chemicals that kill insects including mosquitoes.

326. The Sub-units of 80S ribosome will be
(a) 40S, 40S (b) 60S, 40S
(c) 60S, 20S (d) 55S, 25S
JIPMER-2016, 1996
DUMET-2008
CG PMT-2005

Ans. (b) : A prokaryotic ribosome (70S) is made up of two subunits 50S and 30S while an eukaryotic ribosome (80S) is made up of two subunits 60S and 40S.
Both smaller and larger subunits are attached to presence of mg ion.

327. The two subunits of ribosome remain united at a critical ion level of :
(a) magnesium (b) calcium
(c) copper (d) manganese
BHU PMT (Screening)-2010
AIPMT-2008

Ans. (a) : The two subunits of ribosomes unite only during the process of translation. **Magnesium ion** is essential for binding the ribosome subunits. The value is 1 to 2 millimoles for eukaryotes and 0.5 millimoles for prokaryotes. The subunits separate below this concentration.

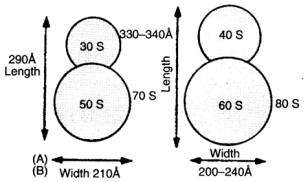


Fig. Ribosomes : (A) Prokaryotic, (B) Eukaryotic

Disintegration of ribosome units occurs at a magnesium ion value of 0.5 millimoles in eukaryotes and below 0.3 millimoles in prokaryotes. The ribosome form dimers when magnesium concentration is higher.

328. The smallest cell organelles, known as protein factories, discovered by George Palade in animal cell in 1953 are
(a) Sphaerosomes (b) Endoplamic reticulum
(c) Ribosomes (d) Dictyosomes
UP CPMT-2014

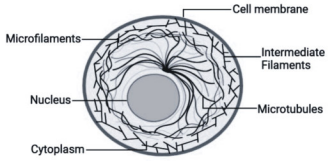
Ans. (c): Geoge palade (1953) discovered smallest cell organelles in animal cell under electron microscope and called paladie's particles . These are Ribosomes which occur either cytoplasm or remain attached with the membrane of endoplasmic reticulum and nucleus. These are referred as protein factories.

329. A complex of ribosomes attached to a single strand of RNA is konwn as
(a) OKazaki fragment (b) Polysome
(c) Polymer (d) Polypeptide
NEET-2016 Phase-I

Ans. (b) : Single strand of ribosome on mRNA molecule during translation is known as **Polysome**. Polysomes are connected by a single molecule of mRNA that is being translated simultaneously by many closely spaced ribosomes.
Polymers are large molecules composed of many monomer units.
Polypeptide is large linear polymer of amino acids bonded together by **peptide linkage.** During DNA replication fragments present on lagging strand called Okazaki fragments.

330. An eleborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called.
(a) Cytoskeleton
(b) Thylakoid
(c) Endosplasmic Reticulum
(d) Plasmalemma
AIPMT (Mains)-2010

Ans. (a) : The cytoskelton are fundamental components of all Eukaryotic cell. It is made up of protein which helps in the maintenance of cell shape is called cytoskeleton.
They are of three type -
1. Intermediate filament
2. Actin filament
3. Microtubules.



- Thylakoid are membrane blound compartments inside chloroplast and cynobacteria. It is the site of the light dependent reactions of photosynthesis.
- Plasmalemma is a very thin membrane, composed of lipids and protein that surrounds the cytoplasm of a cell, and control the passage of substance.
- The endoplasmic reticulum is tubular network of membranes found within the cytoplasm of the eukaryotic cell.

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331. Cytoskeleton is made up of :
(a) Proteinaceous filaments
(b) Calcium carbonate granules
(c) Calluse deposits
(d) Cellulose microfibrils

AIPMT-2009

Ans. (a) : Cytoskeleton is made up of proteinaceous filaments. It is a network of filamentous structures which constitute the supportive structures of the cell. The term cytoskeleton was first coined by **Koltzoff in 1928**. Cytoskeletal structures are of three in types microtubules, microfilaments and intermediate fibers. They are made up of proteins like tubulin, actin, desmin protein myosin etc.

332. In which cell orgenelles a lipoprotein covering is absent?
(a) Ribosomes (b) Lysosomes
(c) Mitochondria (d) Peroxisomes

UP CPMT-2006

Ans. (a) : Ribosomes is one of the cell organelles in which lipoprotein covering is absents**.** It are large non–membranous RNA protein complexes which are necessary for protein synthesis. These are dense granules of 150to 200 A^o diameters (as revealed by electron microspore) and found either in free state or attached to the outside of cytoplasmic membrane just like that of ER or nuclear membrane etc. through ribophorins.
These are also called **Palade particles** as in animal cell first of all observed by Palade in 1955. In plant however these are reported two year early i.e in 1953 by **Robinson and Brown** in bean root.

333. Ribosome may also be called
(a) Microsome (b) Dictyosome
(c) Ribonucleo protein (d) Oxysomes

VMMC-2007
Rajasthan PMT-1999, 2006
UPCPMT-2002

Ans. (c) : Ribosome is also called as Ribonucleoprotein. It is protein manufacturing naked granular nucleo protein organelles made up of rRNA and proteins. Oxysomes are found within mitochondria and are concerned with synthesis of ATP through oxidative phosphorylation.
In plant cell and lower invertebrates Golgi complex called dictyosomes .
■ Microsomes refer to cellular membrane which is recovered through differential centrifugation.

334. Site of formation of ribosomal precursor or ribosomal subunits in cell is
(a) nucleus (b) nucleolus
(c) nucleus body (d) stroma

BVP-2010

Ans. (b) : Nucleolus is spherical structure found in cells nucleus. Its primary function is to produce and assemble cells ribosome. It is the site of ribosomal RNA genes. Its main function is synthesis of RNA ribosome biogenesis.
But exact mechanism of biogenesis of 70S type of ribosomes is less know. Perhaps the cell membrane and genophore play importance role in biogenesis.

335. A non-proteinaceous enzyme is
(a) lysozyme (b) ribozyme
(c) ligase (d) deoxyribonuclease

NEET-2016 Phase-II

Ans. (b) : All enzyme are protein except ribozyme. Ribozyme is the only non proteinaceous enzyme, while lysozyme, deoxyribonuclease, ligase and all other enzymes are proteinaceous enzyme.
• Ribozyme is a form of ribosomal RNA (23S r-RNA) which acts as a catalyst in splicing of RNA during protein synthesis.

336. DNA is not present in :-
(a) Ribosomes (b) Nucleus
(c) Mitochondria (d) Chloroplast

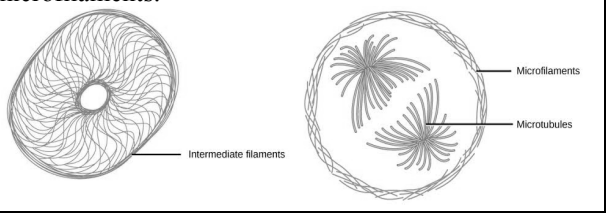
AIPMT-2015

Ans. (a) : Ribosomes do not contain DNA. It is organelles that are responsible for protein synthesis.
DNA is mainly found in the nucleus, however, extra nuclear DNA is found in certain organelles. Mitochondrial DNA is significant in maternal Inheritance, where as chloroplast DNA consists of gene important for photosynthesis.

337. The solid linear cytoskeletal elements having a diameter of 6 nm and made up of a single type of monomer are known as:
(a) Microtubules (b) Microfilaments
(c) Intermediate filaments (d) Lamins

AIPMT-2014

Ans. (b) : The solid linear cytoskeletal elements having a diameter of 6nm and made up of a single type of monomer are known as microfilaments. They are ultramicroscopic long, narrow, cylindrical rods or protein filaments which occur in eukaryotic plant and animal cells.
Microfilament are made up of actin constituting 10-15% of total cell protein. Cyclosis is caused by the activity of microfilaments.



338. Which of the following ions are necessary for assembly of microtubules?
(a) Na^+ and K^+ (b) Ca^{2+} and Cl^+
(c) Ca^+ and Mg^{2+} (d) Na^+ and Ca^{2+}

AIIMS-2011

Ans. (c) : Microtubules is a polymers of tubulin protein. Microtubules are unbranched hollow tubules of indefinite length about 25 nm in thickness with 15 nm core and boundary formed 13 helically arranged photo filaments of globular molecules of α and β tubules.The assembly is accompanied by the hydrolysis of GTP to GDP. The phosphorylatoin of tubulin by a cyclic Amp dependent kinase favors the polymerization. GTP, Ca^{2+} ions and Mg^+ are necessary for assembly of microtubules.

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339. Which one of the following structure is an organelle within an organelle?
(a) Ribosome (b) Peroxysome
(c) ER (d) Mesosome

AIIMS-2015

Ans. (a) : Ribosomes, are smalls dances rounded and granular partical of Ribonucleo protein.
Ribosomes are found in matrix, cytoplasm and chloroplast and also attached with R.E.R and Nuclear membrane.
Ribosomes are present in both prokaryotic and eukaryotic cell.
In eukaryotic cells 80S ribosome (organelles) are attached to rough Endoplasmic Reticulum (ER) which is an organelle. It is also present in the organelles chloroplast (in plant cells) and mitochondria.

340. Polyribosomes are aggregates of:
(a) ribosomes and rRNA
(b) only rRNA
(c) peroxisomes
(d) several ribosomes held together by string of mRNA

AIPMT-1989

Ans. (d) : During protein synthesis several ribosomes held together by string of mRNA ribosomes are the side of protein synthesis.

341. Main component of ribosome are
(a) DNA and RNA (b) RNA and protein
(c) DNA and protein (d) protein and lipids

JCECE-2007
DUMET-2004
Rajasthan PMT - 1995

Ans. (b) : Ribosome first observed by Robinson and Brown [1953] in bean roots. They are present freely in cytoplasm in prokaryotes while present in cytoplasmic matrix in eukaryotes. It is composed of rRNA and Proteins. Ribosomes are also known as Protein factory as they synthesize Proteins in cell. Ribosomes attached to E.R for synthesis of protein.

342. Protein synthesis in an animal cell occurs
(a) only on the ribosomes present in cytosol
(b) on ribosomes present in cytoplasm as well as in mitochondria
(c) only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
(d) on ribosomes present in the nucleolus as well as in cytoplasm

JIPMER-2007
Uttarakhand PMT-2010

Ans. (b) : Protein synthesis takes place in ribosomes in cytoplasm as well as in mitochondria in animal cell. Mitochondrial protein synthesis is essential for oxidative phosphorylations. The process of protein synthesis is known as translation mRNA synthesis occurs in nucleus get transported to cytoplasm where synthesis takes place.

343. Golgi apparatus : (A) Transports and modifies material. (B) Secrete mucin in respiratory tract. (C) Secretes slime in insectivorous plants. What is correct ?
(a) Wrong A, correct B and C
(b) Wrong B, correct A and C
(c) Wrong B and C, correct A
(d) Wrong none, correct all

J&K CET-2005
Punjab MET-2007

Ans. (d) : Golgi complex functions as a factory in which proteins received from ER. They processed and sorted for transport to destinations like lysosomes, plasma membrane. Golgi body secrete mucin in respiratory tract secretes slime in insectivorous plants.

344. Ribosomes that occur exclusively in mitochondria is:
(a) 70S (b) 55S
(c) 30S (d) 50S

DUMET-2004

Ans. (b) : Organellar ribosome from mitochondria and chloroplast are smaller than Cytoplasmic ribosomes. Mitochondrial Ribosomes are 55S. Proteins that are imported into mitochondria, are synthesized in ribosomes. Ribosome are cell organelles that responsible for protein synthesis.

345. The cytoskeleton in plant cell is composed of
(a) microtubules (b) microfilaments
(c) intermediate filaments (d) All of the above

UP CPMT-2012

Ans. (d) : Cytoskeleton is an intracellular network of protein filaments present in cytoplasm. There are three types of cytoskeletal fibres microtubules, intermediate filaments and micro filaments.

346. Ribosomes are essential for protein synthesis, but they are present in Mitochondria and plastids, the sites of respiration and photosynthesis. What is the role of ribosomes in these cell organelles
(a) Ribosomes transport ATP formed in Respiration and photosytnesis to cytoplasm through E.R.
(b) Sub units of some required proteins are synthesised in these organelles
(c) Ribosomes transpors RNA and DNA to cytoplasm
(d) All the above are correct

AP EAMCET-2015

Ans. (b) : Ribosomes are known as protein factory & contains large Riboncleoprotein consisting of RNA& Protein that translate mRNA into polypeptides. Ribosome contains rRNA and r-proteins which are termed as large subunit or small subunit.

Chloroplast	70S	5S, 23S/16S
Mitochondria	55S	16S/12S

347. In ribosomes letter S signifies:
(a) sedimentation coefficient
(b) Svedbergs constant
(c) both (a) and (b)
(d) none of the above

J&K CET-2001

Ans. (c) : In Ribosomes Letter S signifies (svedberg's unit stands for the sedimentation coefficient. It is indirectly a measure of density and size.

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348. Number of protofilament in microtubule is

(a) 13 (b) 12
(c) 5 (d) 10

DUMET-2007

Ans. (a) : Number of protofilament in microtubule is 13. These 13 protofilaments arranged parallel with same polarity singlet microtubule is common in cytosol but specialized microtubule exists as doublets or triplets microtubule structure.

349. Formation of polysome does not require

(a) rRNA (b) mRNA
(c) tRNA (d) snRNA

WB JEE-2014

Ans. (d) : Polysomes are formed during elongation of protein synthesis. Multiple Ribosomes move along the coding region of mRNA, creating a Polysomes. The ability of multiple Ribosomes to function on an mRNA molecule explains limited abundance of mRNA in cell. In this process, mRNA is used as strand and tRNA , rRNA are also used but snRNA doesn't required.

350. Calmodulein is a calcium protein complex in microtubules and microfilaments. It is involved in :

(a) cell- differenciation (b) synthesis of ATP
(c) breakdown of ATP (d) cell motility

BVP-2006

Ans. (d) : Calcium ions are mediated by Calmodulin protein. Calmodulin plays an role in excitation contraction, coupling, cell motility, shape and division.

351. Who among the following discovered microtubules ?

(a) de Robertis and Franchi
(b) Watson and Crick
(c) Ziner and Lederberg
(d) Boveri and Van Beneden

BVP-2006

Ans. (a) : " De Robertis & franchi" in 1953 discovered microtubules in Axoplasm of nerve Fibres. Microtubules are hollow, cylindrical structures & fibres. It is an important role in cell motility microtubule is made up of tubulin heterodimer composed of 250 Kda Sbunits known as α-Tubulin & β-Tubulin.

352. Microfilaments are long, thin, contractile rods(solid) of 6-10 nm diameter. These help in :

(a) movement of cell membrane during mobility and endocytosis
(b) contraction of muscles, functioning of microvilli and undulation of cell membrane
(c) cytoplasmic streming, cleavage of animal celt formation of pseudopodia
(d) all of the above

BVP-2006

Ans. (d) : Microfilament or Actin filament is long, thin contractile rods of 6-10 nm diameter. It is made up of actin binding protein called cross linking protein. It has binding site for nucleotide. It helps in movement of cell membrane during Endocytosis & cell motility, contraction of muscles, functioning of microvillis and undulation of cell membrane, cytoplasmic streaming cleavage of animal cell, formation of Pseudopodia are its functions.

353. Out of the given following cell structure which show polarity is :

(a) microtubules (b) mitochondria
(c) endoplasmic reticulum (d) microbodies

BVP-2006

Ans. (a) : The polarity of the microtubule exists not only at the two ends of filament, but all along the length of its lattice. Microtubules are intrinsically polar fibers, polar microtubules overlap near equatorial plane of Spindle. Microtubules have two distinct ends fast growing plus end slow growing plus end.

354. Which type of ribosomes are found in Nostoc cells?

(a) 50S (b) 60S
(c) 70S (d) Eukaryotic

CMC Vellore - 2011 / CG PMT-2004

Ans. (c) : Nostoc is a cyanobacteria (Prokaryotes) Hence, Ribosomes of Nostoc is prokaryotic which is 70S type Ribosomes in which smaller subunit is 30S and larger submit is 50S.

355. Which among the following can be seen only under the electron microscope?

(a) Chloroplast (b) Ribosome
(c) Leucoplast (d) Nucleus

CG PMT-2004

Ans. (b) : Ribosome is the only structure seen under electron microscope whereas chloroplast leucoplast and nucleus are seen compound microscope.

356. Microtubule is involved in the

(a) cell division
(b) DNA recognition
(c) muscle contraction
(d) membrane architecture

Punjab MET-2010

Ans. (a) : Microtubules are made of alpha and beta tubulin protein that bind together to form chain called protofilament. 13-Protofilament arrange into a cylindrical pattern to form a microtubule.
Microtubules main function is - cell movement cell division, cell transport.

M. Cilia and Flagella

357. Which are the sites of ATPase activity in the cilia and flagella?

(a) Base of cilia and flagella
(b) Doublets
(c) Basal granules of cilia and flagella
(d) Dynein arms

AP EAMCET-11.07.2022 Shift-II
TS EAMCET-09.05.2019 Shift-I
TS EAMCET-02.05.2018 Shift-II
AP EAMCET-28.04.2017 Shift-II
BCECE-2010 / AP EAMCET-2007/ DUMET-2007

Ans. (d) : Dynein arms are the sites of ATPase activity in the cilia and flagella. Dyneins are a family of cytoskeletal motor proteins that move along microtubules in cells. They convert the chemical energy stored in ATP to mechanical work.
Doublet is formed by tubuline protofilaments and other structural proteins such as actins.

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358. Match the following

List -I		List-II	
A	Stichonematic	I	Monas
B	Pantonematic	II	Urceolus
C	Acronematic	III	Astasia
D	Anematic	IV	Polytoma
		V	Cryptomonas

The correct match is

	A	B	C	D
(a)	I	V	III	II
(b)	III	I	IV	V
(c)	II	III	I	IV
(d)	IV	II	III	I

TS EAMCET-08.05.2019 Shift-II
TS EAMCET-29.09.2020 Shift-II
TS EAMCET-15.05.2016
TS EAMCET-12.05.2017

Ans. (b) : On the basis of arrangement of mastigonemes and nature of axial filament, there are five types of flagella:-
Stichonematic:- Mastigonemes are present on one side of flagella. eg. Astasia
Pantonematic:- Two or more rows of mastigonemes are present on both sides of flagellum eg. Monas
Acronematic:- Mastigonemes absent & distal end of flagellum. eg. Polytoma
Anematic:- Flagellum is simple without mastigonemes. eg cryptomonas

359. Flagella of prokaryotic and eukaryotic cells differ in
(a) Type of movement and placement in cell
(b) Location in cell and mode of functioning
(c) Micro-tubular organization and type of movement
(d) Micro-tubular organization and function

CMC Ludhiana-2009
Manipal-2007
AIPMT-2004
MANIPAL-2014
AFMC-2008

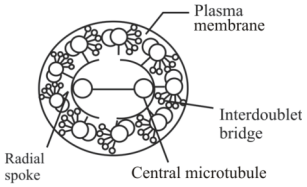
Ans. (c) : Flagella of prokaryotic and eukaryotic cells differ in micro-tubular organisation and type of movement.
Prokaryotic- They are in single-celled microganism. They are known to be the earliest on the earth. They also included Bacteria and arechaea. There microtubule organization is (9 + 0)
Eukarytotic- They have nuclear membrane. It has mitochondria, Golgi bodies and cell wall. There microtubule organization is (9 + 2)

360. The sequential movement of cilia, in a longitudinal row, one after the other in one direction is called
(a) Undulation movement
(b) Synchronous movement
(c) Metachronous movement
(d) Effective stroke

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Metachronous movement the sequential movement of cilia in a longitudinal row, one after the other in one direction is called Metachronous movement.
Synchronous-Movement cilia in a raw beat sequentially.

361. In the below diagram, identify the part which connects the peripheral microtubules to the central sheath.



(a) Plasma membrane (b) Interdoublet bridge
(c) Central microtubule (d) Radial spoke

Karnataka CET-2020

Ans. (d) : Radial spokes connected peripheral microtubules to the central sheath of cilia and flagella of eukaryotic cells. There are nine radial spokes. Radial spokes are made up of protein and least 23 proteins that works as a mechanochemical transducer between central - pair apparatus and peripheral microtubule.

362. Cross bridges between peripheral microtubules of cilia and flagella are made up of motor protein _____.
(a) myosin (b) actin
(c) dynein (d) keratin

MHT CET-06.10.2020 Shift-I

Ans. (c) : Cross bridges between peripheral microtubules of cilia and flagella are made up of motor protein dynein. It is cytoskeleton motor protein which Dynein arms convert the chemical energy stored in ATP to mechanical work.
Actin-It is the main cytoskeleton components of dendritic spines. It has abundant protein in eukaryotic cells.

363. If the flagellum is provided with two or more rows of lateral appendages and the axoneme ends in a terminal naked filament, then it belongs to this type
(a) Pantonematic (b) Stichonematic
(c) Pantacronematic (d) Acronematic

TS EAMCET-02.05.2018 Shift-I

Ans. (c) : On the basis of arrangement of mastigonemes the flagella are five type. Stichonematic, Acronematic, Anematic, Pantonematic, Pantacronemati. There is presence of two or more rows of lateral appendages and axonemes ends in terminal naked filament, then it belongs to pantocronematic type.

364. Choose the correct statements with reference to flagella
(A) Do not unite to form cirri
(B) Found all over the body
(C) Perform undular movements
(D) Perform pendular movements
(a) A & D (b) A & C
(c) B & C (d) C & D

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Flagella are microscopic hair- like structure involved in locomotion of a cell. They do not unite to form cirri that know as undulating, membrane and perform undulation movements in Paragoans. Protozoans while cilia show rowing type movement.

@apna_pdf

365. What is common between a eukaryotic and prokaryotic flagella?
(a) Same structure
(b) Both are used for locomotion
(c) Composed of same proteins
(d) Both are extension of cell membrane

JIPMER-2018

Ans. (b) : Prokaryotic flagella are made up of flagellin while eukaryotic flagella are made up of tubulin. Flagella of prokaryotes is proton driven whereas eukaryotic flagella is ATP driven. But both are used for locomotion.

366. The cell organelle involved in the formation of a flagellum / cilium
(a) Mitochondria (b) Lysosome
(c) Basal granula (d) Golgi complex

TS EAMCET-12.05.2017

Ans. (c) : Basal granule also known as kinetosome. It is a protein structure found at the base of a eukaryotic cilium or flagellum. Basal body serves as a site for growth of the axonem function. Basal bodies arises from central of the centrosome.

367. Electron microscopic study of cilium and flagellum revealed that they are covered with plasma membrane and the core structure is called "axoneme", possesses a number of microtubules running parallel to the long axis. How many number of microtubule arrays are arranged peripherally and centrally
(a) 9 + 2 (b) 8 + 4
(c) 9 + 3 (d) 8 + 2

TS EAMCET-12.05.2017

Ans. (a) : Flagella is locomotory organ in prokaryotes and eukaryotes but it is different in Prokaryotes & Eukaryotes.
The core of flagellum called Axoneme, Possesses of number of microtubules running parallel to the long axis. The axoneme usually has nine doublets of radially arranged peripheral microtubules and pair of centrally located microtubules. Such an arrangement of axonemal microtubules is referred to as the 9 + 2 array.

368. The number of microtubules in a flagellum including those sharing three protofilaments with each other is
(a) 11 (b) 20
(c) 22 (d) 10

DUMET-2010

Ans. (b) : Number of microtubules in a flagellum including those sharing three protofilaments with each other are 20.
Microtubules are made of alpha and beta tubulin protein that bind together to form chain called protofilament. It can cooperate with other proteins or function independently.

369. The filaments present in cilia and flagella are composed of:
(a) microtubules (b) microfilaments
(c) microfibrils (d) microvilli

VMMC-2006

Ans. (a) : The filaments present in cilia and flagella are composed of microtubules they are and autonomically made up of microtubules which are arranged in a 9 + 2 pattern. Their core, called the axoneme possesses a number of microtubles running parallel to the long axis
Microvilli are small finger-like projections found in same cells which help in increasing the surface area of absorption.
Micofibrils are small fimbrae found in the cytoplasm. They are normally made up of glycoproteins and cellulose.

370. An organism exclusively with 70 S type of ribosomes contains one of the following:
(a) DNA enclosed within a nuclear membrane
(b) Circular naked DNA
(c) Double stranded DNA with Protein coat
(d) Single stranded DNA with Protein coat

AP EAMCET-2004

Ans. (b) : An organism exclusively with 70 s type of ribosomes found in prokaryotic and contains circular naked DNA. It can form a closed loop DNA that has no ends. such types of DNA is only found in the cytoplasm of most prokaryotic cells.

371. Ribosomal RNA (rRNA) is synthesized in
(a) nucleolus (b) nucleosome
(c) cytoplasm (d) ribosome

CG PMT-2009

Ans. (a) : Ribosomal RNA (rRNA) is synthesized nucleolus. It appears a dense area within the nucleus. The site of rRNA, transcription and processing and of ribosome assembly is nucleolus. They are most important organelles that are found in both prokaryotic cells and eukaryotic cells.
Nucleosome is a basic structural unit of DNA.
Its structure consist of a segment of DNA wound around eight histone proteins and resemble thread wrapped around a spool.

372. The number of RNA molecules in 60S sub – particles of 80 S ribosomes are
(a) five (b) four
(c) three (d) two

CG PMT-2009

Ans. (c) : The number of RNA molecules in 60S sub particles of 80S ribosome are three 60S subunit:- 28S rRNA, 5S rRNA, 5.8S rRNA.
RNA is Ribonucleic acid and helps in the synthesis of proteins It also responsible for the production of new cells in the body. RNA also have genetic nature like DNA. This is called genetic RNA.

373. Bacterial flagella do not show ATPase activity and 9 + 2 organization. These are chemically :
(a) Flagellin (b) pilin
(c) tubulin (d) bacterin

AFMC-2006
Uttarakhand PMT-2007

Ans. (a) : Bacterial flagella do not show ATPase activity and 9+2 organization. These are chemically Flagellin.
Pilin are hair like appendages structure and found on archaea and bacteria. They are also known as long Fimbriae protein.

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374. Term basal body is associated with the development of

(a) cilia and flagella (b) cell plate
(c) phragmoplast (d) kinetochore

VMMC-2007

Ans. (a) : Term basal body is associated with the development of cilia and flagella. It is a protein structure found at the base of cilium or flagellum. It is formed from several protein structures.

Kinetochore - They have assemble of large protein that connect chromosomes to microtubules of the meiotic spindles in order to separate the replicated genome from a mother cell to their daughter.

Phragmoplast - It builds a cell wall between daughter cells. It is a plant cell definite structure that forms during late cytokinesis.

375. The spindle microtubules are polar, their orientation is

(a) + and – both ends toward the equator
(b) + end towards the poles
(c) – ends towards the poles
(d) + and – both ends towards the poles

AMU-2003

Ans. (c) : The spindle microtubules are polar, their orientation is '–' ends towards the poles and '+' end toward kinetochores. Their poles dictate where duplicated chromatids are transported at anaphase of mitotic cell division.

376. Cilia are:

(a) short (5-10μm) hair like narrow protoplasmic processes
(b) with sweeping or pendular movements
(c) more numerous
(d) all of the above

J&K CET-2004

Ans. (d) : Cilia are small membrane bound organelle found on most types of eukaryotic cell Known as cilia. Cilia are absent in bacteria & archaea. Cilia are small, (5-10μm) slender, hair-like structure present on surface of all mammalian cells. But Infusoria (Protozoa) cilia made appendices or cirri that know as undulating, membranes. They play major role in locomotion. They are involved in mechanoreceptors.

There are 2 types of cilia-Motile cilia and non-motile cilia.

377. Flagella with single strand and composed of flagellin is found in:

(a) prokaryotes (b) eukaryotes
(c) both (a) and (b) (d) none of the above

J&K CET-2002

Ans. (a) : Prokaryotic flagellum spins, creating forward movement by corkscrew shaped filament. Prokaryotes have one or several flagella, localized to one pole. It is composed of flagellin proteins. ATP synthase not required in prokaryotic because. flagellum protein utilize the energy by proton process power.

378. Prokaryotic flagella are having

(a) unit membrane-enclosed fibre.
(b) helically arranged protein molecule
(c) microtubular 9+2 membrane enclosed structure
(d) protein membrane enclosed fibre.

AMU-1995

Ans. (b) : Prokaryotic flagella are composed of protein "flagellin" arranged in helical chains. That intertwine and form a helix around at to identify certain pathogenic bacteria unlike eukaryotes, the filaments are not covered by membranes or sheath. Each filament has rotator motor at its base which turn clockwise or counterclockwise it provides motility to bacteria.

379. Male gemetes are flagellated in :

(a) Anabaena (b) Ectocarpus
(c) Spirogyra (d) Polysiphonia

AIPMT-2015

Ans. (b) : Male gametes are flagellated in Ectocarpus. Ectocarpus is a filamentous marine brown algae which is heterotrichous in nature. Motile reproductive cell have two lateral or sub apical flagella one directed forward and other backward.

In Spirogyra the male gametes are non flagellated and show amoeboid movement.

Polysiphonia is a small upright bushy marine algae that also produces non-flagellated spermatia.

Anabaena is a cynobacteria, they mostly reproduce asexually by Binary fission, fragmentation, endospore formation.

380. The motile bacteria are able to move by

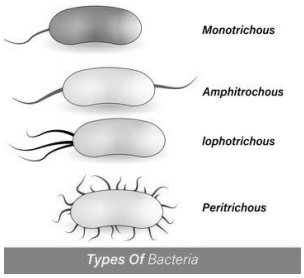
(a) Fimbriae (b) Flagella
(c) Cilia (d) Pili

AIPMT-2014

Ans. (b) : Flagella is a whip-like appendage present on the surface of the bacteria. It is made up of a **flagellin protein.** Locomotion are three types of movement in bacteria.

(a) Flagellar movement- Prokaryotic flagellum move from base body either clockwise or counter clockwise.
(b) Spirocaetial movement such as flexing, spinning free swimming.
(c) Gliding movement found in cyanobacteria and mycoplasma show gliding movement

- Cilia are small hair-like protuberances on the outside of eukaryotic cells. They are primarily responsible for locomotion, either of the cell itself or of fluids on the cell surface.



- Pili are hair like proteinaceous, filamentous polymeric organelles expressed on the surface of bacteria and involved in bacterial conjugation.

381. The filament in flagellum can rotate by:

(a) 360º (b) 60º
(c) 120º (d) 80º

BCECE-2015

@apna_pdf

Ans. (a) : Bacterial flagella are helical filament, a proximal at its base associated with the cell wall and cytoplasmic membrane and structures contains flagellin. Flagellum rotates in clockwise or anticlockwise direction. Flagella rotate clockwise as bacteria rotate flagella clockwise at 360°.

382. Principle protein of cillia and flagella is :

(a) globulin (b) fibrin
(c) flagellin (d) tubulin

BVP-2014/MGIMS Wardha-2006/AP EAMCET-2001

Ans. (d) : There are two principle cytoskeletal and motor proteins i.e. tubulin & dyenein these were found & first described in cilia & flagella. Eukaryotic cilia & flagella is composed of 9 + 2 arrangement. Tubulin protein forms a core structure of microtubules. Major function of these structure are in cell motility.

N. Centrosome and Centrioles

383. Arrange the types of chromosomes based on length of the arms and centromere from the given characteristics respectively.
Terminal centromere, one long arm
Extreme short arm, two equal arms

(a) Metacentric, submetacentric, Telocentric, Acrocentric
(b) Telocentric, Submetacentric, Acrocentric, Metacentric
(c) Acrocentric, Metacentric, Submetacentric, Telocentric
(d) Telocentric, Metacentric, Acrocentric, Submetacentric

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : The types of chromosomes based on the length of the arms and centromere are–

- **Telocentric–** It have one arm and one centromere. It gives terminal appearance along centromere.
- **Submetacentric–** It have two unequal arms. It contain one shorter and one longer arm.
- **Acrocentric–** In this position, centromere is located close to one end of the chromosome, resulting one very short and one very long arm.
- **Metacentric–** It have two equal arms. Centromere located in the middle of the chromosome, dividing it into two identical arms.

384. Match List-I with List-II.

	List-I		List-II
(A)	**Metacentric chromosome**	**(i)**	**Centromere situated close to the end forming one extremely short and one very long arms**
(B)	**Acrocentric chromosome**	**(ii)**	**Centromere at the terminal end**
(C)	**Submetacentric**	**(iii)**	**Centromere in the middle forming two equal arms of chromosomes**
(D)	**Telocentric chromosome**	**(iv)**	**Centromere slightly away from the middle forming one shorter arm and one longer arm**

Choose the correct answer from the options given below :

(a) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(b) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)
(c) (A)-(i), (B)-(iii), (C)-(ii), (D)-(iv)
(d) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)

NEET-2022

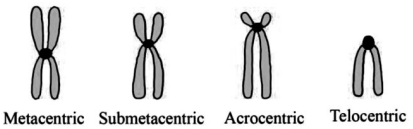
Ans. (b) : Metacentric - Chromosome have a Centromere in the middle of chromosome and divided the chromosome into two equal arms the shape of the metacentric chromosome is X shape.

Acrocentric - The centromere is present near the end of chromosomes one extremely short and one very long arms. J chromosomes are acrocentric in human.

Submetacentric Chromosome - Centromere slightly away from the middle or forming one shorter arm and one longer arm. It is an L or J - shaped chromosome most chromosomes in humans are submetacentric, and X chromosome also found.

Telocentric Chromosome - It is not observed in human. They have centromere present at the terminal of the chromosome. The shorter arm is rarely visible, shape of the chromosome at anaphase is like the letter i.

Types of Chromosomes



385. Study the following statements and find correct answer.

(A) In centriole the peripheral fibril is a triplet and are connected with central part by protein materials.
(B) Large and more numerous nucleoli are present in the cells of active protein synthesising cells as they are membrane bound structures.
(C) The density and size of ribosomes are represented by their Svedberg units which indicate their sedimentation coefficients.
(D) The carotenoid pigments are yellow or orange and not soluble in water.

Options:

(a) A,B,C (b) A,C,D
(c) B,C,D (d) B,D

AP EAMCET-28.04.2017 Shift-II

Ans. (b) : In centriole, peripheral fibril is triplet & connected with central part by proteinaceous material called "Hub". Hub and spoke is part of centriole.

Density and size of ribosomes are represented by their sevederg units which indicate their sedimentation coefficients.

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Carotenoids pigments are yellow or orange and not soluble in water.

Large and more numerous nucleoli are present in the cells of active protein synthesising cells as they are not membrane bound structures.

386. Which is not a intracellular compartment in the cell?

(a) Nucleus (b) Mitochondria
(c) Chloroplast (d) Centriole

BVP-2010

Ans. (d) : Centriole are not considered intracellular compartment because they do not form any compartment in a cell. Their structure are paired barrel-shaped organelles situated in the cytoplasm of animal cells near the nuclear envelope. They also play an important role in determine the locations of the nucleus and other organelles within cell.

387. Plants cell differs from an animal cell in the absence of

(a) endoplasmic rericulum
(b) mitochondria
(c) ribosomes
(d) centrioles

AMU-2012
BHU PMT (Mains)-2011
UP CPMT-2007

Ans. (d) : Plant cell differs from an animal cell in the absence of centrioles. They are cylindrical in structure. They involve in cell division. Plant cells lack centrioles where as animal cells possess centrioles.

Animal cell have lysosomes but plant cell lack lysosomes.

388. When the centromere of a chromosome is located near the tip of the chromosome, the position is described as :

(a) acrocentric (b) metacentric
(c) telocentric (d) acentric

JIPMER-1999

Ans. (c) : When the centrosome of a chromosome is located near the tip of the chromosome then, the position is discribed as telocentric. Due to the above condition, it has only one arm. It is not present in human.

Metacentric- It is a chromosome that centromere is centrally located. As a result, its arms are almost equal in length there are 'v' shaped, chromosome.

Acrocentric – Acrocentric chromosome the centromere is situated close to its end forming one extremely short and one very long arm.

Acentric– centromere is absent.

389. Replication of centriole occurs during

(a) interphase (b) prophase
(c) late prophase (d) late telophase

Manipal-2008
BCECE-2014
Uttarakhand PMT-2008

Ans. (a) : Replication of centriole occurs during interphase, They also help in the formation of spindle fibers that separate the chromosomes during cell division. They always found in pairs and move towards the poles of the nucleus when occur time for cell division, During 'S' phase of the interphase, they separate and produce two pairs of centriols and DNA also replication.

390. The flagellumin Astasia is:

(a) pantonematic (b) acronematic
(c) pantacronematic (d) stichonematic

AP EAMCET-2002

Ans. (d) : The flagellumin Astasia and euglena is stichonematic type. The structure of Astasia is a hair like structure that works primarily as an organelle of locomotion in the cells of living organism.

Pantonematic - Two rows or more than two rows of mastigorenes are present on both sides of the flagellum is called pantonematic e.g pyronema.

391. Astral rays are formed of

(a) Micro-filaments (b) Microtubules
(c) Intermediate filaments (d) Microvilli

VMMC-2008

Ans. (b) : Astral rays are formed of microtubules. It is composed of radiate, microtubule from the centrosphere and appear like a cloud. It bodies are produced by centriole during cell division and attach with centromere of the chromosome.

Microvilli - They are small finger like projections that are present on the surface of select epithelial cells. They are setelled in parallel bundles. They are located in some areas of both body cell.

392. Human sperm cells move by means of a

(a) Dlium (b) Flagellum
(c) Basal body (d) Hair

CG PMT-2010

Ans. (b) : Human sperm cells move by means of a basal body. When sperm cells are formed, this process known as spermatogensis. During sparmiogenesis the spermaties develop into mature sperm having head and tail. Tail of sperm is consist of complex axial filament and their arrangement is (9+2) tail consist of neck middle piece. Principle piece and end piece. This process takes place in the male body mature cells can survive for up to 5 day in the female reproductive system after ejaculation sperm cell cannot segregate and have a limited lifespan, but after fusion with egg cells during fertilization, a new organism begins developing.

393. Microtubules are the constituents of

(a) Centrosome, Nucleosome and Centrioles
(b) Cilia, Flagella and Peroxisomes
(c) Spindle fibres, Centrioles and Cilia
(d) Centrioles, Spindle fibres and Chromatin.

NEET-2016 Phase-I

Ans. (c) : Microtubules is structural component of spindle fibre, cillia, Flagella, centriole etc.

Microtubules are tubuline polymers, part of cytoskeleton, which provide structure and shape of eukaryotic cells. **Spindle Fibres** from the protein structure which helps of mitosis and meiosis.

Centrioles are the two cylindrical structures of a cell organelle called centrosome.

Cillia and **Flagella** are fine hair like outgrowths of the membrane.

While peroxisomes are microbodies.

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394. Centrioles (imicrocentrosoem or cell centre) is :
(a) microtubuler and membraneles
(b) absent in Amoeba, red algae, blue-green algae, conifers and angiosperm and made up of a peripheral implet microtubular
(c) basically locomotary and their role in spindle formation is secondary
(d) all of the above

Uttarakhand PMT-2006

Ans. (d) : Centriole is barred shaped polarized structure made up of microtubules. Present in animal cells, fungi and some algae Absent in plant cells. Composed of nine triplet microtubule (9 + 0) arrangement. Central part is proteinaceous & called hub. They are basically locomotory in function & their role is spindle fibre formation is secondary.

395. The following structure is NOT found in plant cells
(a) vacuole (b) nucleus
(c) centriole (d) endoplasmic reticulum

KVPY (SA)-2011

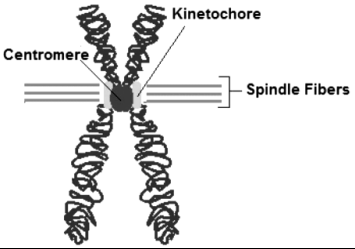
Ans. (c) : Centriole is present in animals but absent in plant cells. Hence it is a characterstic of animal cell. It plays important role in cell division, movement and spindle fibre formation during cell cycle.

396. Centromere is required for –
(a) Movement of chromosomes towards poles
(b) Cytoplasmic cleavage
(c) Crossing over
(d) Transcription

JIPMER-2007
AIPMT-2005, 1994

Ans. (a) : The centromere is the part of the chromosomes, where two sister chromatid are attached and it is site for attachment of spindle fiber.

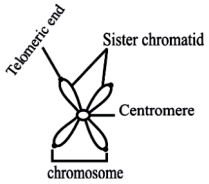
- Centromere help in proper alignment and segregation of the chromosomes during the process of cell division in eukaryotic cell.
- Their physical role is to act as the site of assembly of the kinetochore, a highly complex multi protein structure that is responsible for actual events of chromosome segregation. On the basis of centromere location, chromosomes are four type such as metacentric, submetacentric, acrocentric, telocentic.



397. Which of the following occurs more than one and less than five in a chromosome
(a) Chromatid (b) Chromomere
(c) Centromere (d) Telomere

Jipmer-2002
AIPMT-2002

Ans. (d) : Each chromatid have one telomeric end. Telomere are present both ends of each chromosome and protect genome from nucleolytic degradation.
Telomere is a cap like structure present at the end of each strand of DNA. It protects the chromosomes from sticking to another chromosome.



398. The modified cell organelle involved in the formation of cilia and flagellum
(a) Golgi complex (b) Centriole
(c) Stigma (d) Nucleolus

AP EAMCET-2016

Ans. (b) : The modified cell organelle involved in the formation of cilia and flagellum are Centriole. It is barrel- shaped polarized structure made up of microtubules present in animal cell. It is composed of nine triplet microtubules in (9 + 0) arrangement. Pair of centrioles present in MTOC (microtubule organizing centre) known as centrosome. It is modified cell orgnelle involved in cilia & flagella formation.

399. Organelle important in spindle formation during nuclear division is:
(a) Golgibody (b) chloroplast
(c) centriole (d) mitochondrion

J&K CET-2005

Ans. (c) : Centrioles play an important role in spindle fibre formation during cell division. When cell is going to divide those centrioles go to opposite ends of the nucleus. Centrioles form areas that mitotic spindle forms & in completion of cytokinesis centrioles can self replicate during cell division at S -phase.

400. A cell organelle lacks its own DNA, however it is able to replicate. It is
(a) centriole (b) ribosome
(c) nucleolus (d) peroxysomes

BVP-2014, 2013

Ans. (a) : Centriole lacks its own DNA but is able to replicate itself by centrosome cycle. Process of centrosome duplication & separation is known as centrosome cycle. During interphase of each cell cycle, centrioles & other components of centrosomes are duplicated. It also uses semiconservative mechanism of duplication.

401. In cells, centrioles occur:
(a) singly (b) in duplets
(c) in triplets (d) none of these

J&K CET-2001

Ans. (c) : Centrioles is barrel shaped structure made up of microtubule the wall of each centriole are composed of nine triplet mierotubule (9 + 0) arrangement. In animal cells centrioles organize the pericentriolar material to produce microtubules including mitotic spindle fibres.

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O. Nucleus and Microbodies

402. L-shaped chromosomes are also called

(a) acrocentric (b) telocentric
(c) sub-metacentric (d) None of the above

JIPMER-2009 / Haryana PMT-2011
UP CPMT-2012, 2008 / VMMC-2012
Uttarakhand PMT-2008
BHU PMT (Screening)-2008
CGPMT-2008, 2004
Manipal–2008 / BVP - 2007
BHU PMT-2004 / UP CPMT-2003
UP CPMT-2012 / CG PMT – 2008 / BVP - 2007

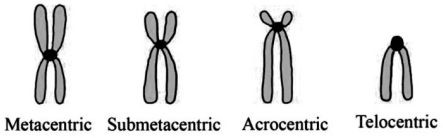
Ans. (c) : Submetacentric Chromosome - Centromere slightly away from the middle forming one shorter arm and one longer arm. it is an L - shaped chromosome most chromosomes in humans are submetacentric, and X chromosome also found.

Metacentric - Chromosome have a Centromere in the middle of chromosome and divided the chrosome into two equal arms the shape of the metacentric chromosome is V shape.

Acrocentric - The centromere is present near the end of chromosomes one extremely short and one very long arms. J chromosomes are acrocentric in human.

Telocentric Chromosome - It is not observed in human. They have centromere present at the end of the chromosome. The shorter arm is rarely visible, shape of the chromosome at anaphase is like the letter i.

Types of Chromosomes



403. The nucleus is separated from surrounding cytosplasm by a nuclear membrane, which is

(a) single layered with pores
(b) single layered without pores
(c) double layered with pores
(d) double layered without pores

Punjab MET-2004 / VMMC-2004
HP CET-2012 / Manipal-2000
Manipal-2012

Ans. (c) : Nuclear membrane, which is double layered with pores that separates the nucleus from cytoplasm of cell. The nuclear pore complex are very specific and made up of 30 different protein called nucleoprotein. The nuclear pore complex is help in transport of material from nucleus to cytoplasm and vice-versa.

404. Balbiani rings are the structural features of

(a) allosomes
(b) autosomes
(c) polytene chromosomes
(d) Lampbrush chromosomes

JIPMER – 2008 / Punjab MET – 2006
Karnataka CET-2004
Manipal-2011, 2002

Ans. (c) : Balbiani rings are the structural features of polytene chromosomes. Balbiani rings are locations for RNA synthesis, Which are found on the polytene chromosome in the form of large puffs in the diptera *Chironomus tentans*. These puffs help to studies of the structure of active genes, and transport of structure of active genes, and transport of specific RNA-protein (RNP) particles.

405. If centromere is the middle, the chromosome is called :

(a) sub-metacentric (b) metacentric
(c) acentric (d) telocentric

CG PMT-2007
MGIMS Wardha-2005
UP CPMT-2005
AMU-2002

Ans. (b) : If centromere is the middle, the chromosome is called metacentric. It is a chromosome whose centromere is centrally located and divide the chromosome into two equal parts arms.

406. Giant chromosomes are found inside

(a) nucleus of man
(b) oocytes of frog
(c) salivary glands of silk moth
(d) salivary glands of Drosophila

BCECE-2014
DUMET-2006
CG PMT-2004
AMU-2002

Ans. (d) : Giant chromosomes are found inside salivary glands of drasophila. They have only two pair chromosomes. Female Drosophila have two 'X' chromosomes and male drosophila have one 'X' and one 'Y' chromosomes.

407. Centromere is a part of:

(a) ribosomes
(b) mitochondria
(c) chromosome
(d) endoplasmic reticulum

HP CET-2013
VMMC-2003
BHU PMT-2002
Haryana PMT - 2000

Ans. (c) : Centromere is a part of chromosome where sister chromatids are attached. This constricted region of chromosome connects the sister chromatids, creating a short arm (p) and a long (q) on the chromatias. It plays an important role in the cell division.

408. A non - staining secondary constriction at a constant location of few chromosomes is called

(a) Centromere (b) Short arm
(c) Satellite (d) Kinetochore

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : A satellite is a repetitive DNA sequence located near the centromere of certain chromosomes. It appears as a small extension from the main chromosome body when stained and observed under a microscope. It helps in stabilizing chromosome and proper division during cell replication but it's exact function is still not known.

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409. Match the following?

Chromosomes		Centromere		Chromatids	
A.	Metacentric	i.	Nearer to one end	P.	Extremely short and long
B.	Telocentric	ii.	Middle	Q.	One arm
C.	Submetacentric	iii.	Close to its end	R.	Two equal arms
D.	Acrocentric	iv.	Terminal	S.	One short one long

Options:

(a) (A-i-P), (B-ii-R), (C-iii-Q), (D-iv-S)
(b) (A-ii-R), (B-iii-Q), (C-iv-P), (D-i-S)
(c) (A-ii-R), (B-iv-Q), (C-i-S), (D-iii-P)
(d) (A-iv-Q), (B-i-P), (C-ii-R), (D-iii-S)

MHT CET-08.10.2020 Shift-I
AP EAMCET-03.09.2021 Shift-II

Ans. (c) : The metacentric chromosome has middle centromere forming two equal arms.

- The sub-metacentric chromosome has centromere slightly away from the middle of the chromosome resulting into one shorter arm and one longer arm.
- Acrocentric chromosome, the centromere is situated close to its one end forming one extremely short and long arm.
- Telocentric chromosome has terminal centromere.

410. Fill in the blanks with suitable words respectively.

Each chromosome has a _____ or _____ on the sides, disc shaped structure is called _____ . The _____ chromosome has two equal arms, _____ chromosome has one shorter and one long arm. _____ chromosome has no second arm. The secondary constriction develop small fragment called _____.

(A) metacentric
(B) telocentric
(C) centromere
(D) primary constriction
(E) submetacentric
(F) satellite
(G) kinetochore

Options:

(a) A, C, B, D, G, E, F
(b) D, C, G, A, E, B, F
(c) B, A, C, D, G, E, F
(d) B, A, D, G, C, E, F

TS EAMCET-09.08.2021 Shift-I

Ans. (b) : Each chromosome has a primary constriction or centromere on the sides, disc shaped structure is called kinetochore. The metacentric chromosome has two equal arms, submetacentric chromosome has one shorter and one long arm. Telocentirc chromosome has no second arm. The secondary constriction develop small fragment called satellite.

411. Telomere has a unique property of _____.

(a) condensation of chromatin network.
(b) prevention of ends of the chromosomes from sticking together.
(c) attaching to spindle fibres.
(d) regulation of protein synthesis

MHT CET 5.10.2020 Shift-I

Ans. (b) : Telomere has a unique property of prevention of ends of the chromosomes from sticking together. These are nucleotide sequences found at both ends of each chromosome which protect the genetic information.

412. In prokaryotes both transcription and translation take place in cytoplasm as there is no _____.

(a) chromosome (b) nucleus
(c) ATP (d) ribosome

MHT CET-07.10.2020 Shift-I

Ans. (b) : In prokaryotes both transcription and translation take place in cytoplasm as there is no nucleus.
Transcription is continuous process and occurs in the cytoplasm. In prokaryotes only single type of RNA polymerase is used to synthesize RNA molecules.

413. The nuclear size does NOT depend on _____.

(a) volume of the cell
(b) shape of the cell
(c) amount of proteins
(d) amount of DNA

MHT CET-08.10.2020 Shift-I

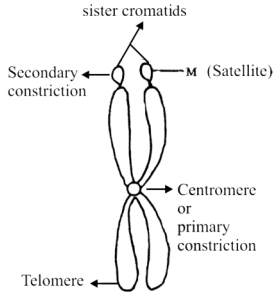
Ans. (b) : Nuclear size depends on mass, volume of cell amount of proteins & DNA but not on shape of the cell.

414. Identify the part labelled as 'M' in the diagram given below :

(a) Kinetochore (b) Satellite
(c) Chromatid (d) Centromere

Karnataka CET-2019

Ans. (b) : The Labelled part 'M' in the diagram is satellite.
Besides primary constriction or centromere a chromosome may have or more secondary constriction. a secondary constriction present near the distal part of an arm may develops a small out growth or fragment called satellite.
A chromosome having satellite is called sat chromosome. Sat chromosomes are called marker chromosomes.



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415. Nucleolus is an organelle responsible for the production of

(a) carbohydrates (b) messenger RNA
(c) lipids (d) ribosomal RNA

NEET-2018
UPCPMT-2013
KVPY SB & SX-2013

Ans. (d) : Nucleolus is an cell organell responsibal for the production of ribosomal RNA. Nucleolus described by F. Fontana. It is a non-membrane bound structure which disappears in late prophase & reappears in Telophase stage of cell division. Each nucleolus is produced by a Nucleolar organizing Region (NOR) of a chromosome. In humans chromosome 13, 14, 15, 21 & 22 contain rRNA genes in a region called Nucleolar organizing region (NOR).

416. A chromosome in which the centromere is situated close to its end so that one arm is very short and the other very long is

(a) acrocentric (b) metacentric
(c) sub-metacentric (d) telocentric

JIPMER-2017
DUMET-2009

Ans. (a) : A chromosome in which the centromere is situated close to its end so that are arm is very short and the other very long is acrocentric.

- Metacentric chromosome is present in the middle of the chromosome and divides the chromosome into p and q arms in equal parts.
- Telocentric chromosome has a terminal centromere.

417. The____is a primary constriction

(a) Telomere (b) Sarcomere
(c) Chromomere (d) Centromere

MHT CET-2017

Ans. (d) : Centromere is the site of primary constriction of a chromosomes. It play a key role in helping the cell division. It the region where the spindle fibers attach.

418. What is the approximate size of nucleus in a typical mammalian cell?

(a) 2.2 meter (b) 1.2 meter
(c) 10^{-4} meter (d) 10^{-6} meter

MHT CET-2017

Ans. (d) : In a mammalian cell, nucleus is largest organelle Approximate size of nucleus in mammalian cell is 10μ i.e. 10^{-6}m. The size of nucleus is variable. In metabolically active cell size of nucleus is larger than metabolically inactive cell.

419. Spindles are formed by:

(a) microtubules (b) endoplasmic reticulum
(c) golgi body (d) peroxisomes

Rajasthan PMT-2004

Ans. (a) : Spindles are formed by microtubule. They are bipolar fibrous in structure that are composed mainly of microtubule. They are composed of tubulin protein. Spindles arise from centriole in animal cell. Spindles forms during cell division to divide sister chromatids between daughter cells. They include the spindle microtubles, associated proteins.

420. Balbiani rings are the centre for

(a) DNA synthesis (b) RNA synthesis
(c) Both (a) and (b) (d) None of the above

AIPMT-1993 / BCECE-2011

Ans. (b) : Balbiani rings are the centre for RNA and Protein synthesis. Polytene chromosomes were fist observed by Balbiani (1881) chironomus (dipteran larva) and also called salivary chromosomes because have been seen salivary gland of larvae. They are large puffs on the polytene chromosome. These puffs are suited to studies of the active gene and transport of specific RNA protein particles. They are ring like in the structure.

421. The point at which polytene chromosome appear, to be attached together is called

(a) centriole (b) centromere
(c) chromomere (d) chromocentre

AMU-2006 / Karnataka CET-2006
Punjab MET-2003

Ans. (d) : The point at which polytene chromosome appear, to be attached together is called chromocentre. They contain pecentromeric regions of DNA. Proteins are also present in Chromocentre region.
Chromomere is also known asidiomere Beads like structure appear on a chromosome during prophase of meiosis' and mitosis. They car be use in genetic and evolution any studies .

422. Connecting link of characters between one generation to another generation is :

(a) nucleus (b) nucleic acid
(c) chromosome (d) none of these

Rajasthan PMT-1996

Ans. (c) : Connecting link of characters between one generation to another generation is chromosome. Chromosomes are thread like in structure that made of protein and single DNA. They help to carry the genomic information from cells to cell. chromosome are stained by acetocarmine some colorful dyes.

423. Genes are present on

(a) chromosomes (b) lamellae
(c) plasma membrane (d) mesosomes

UP CPMT-2003

Ans. (a) : Genes are present on chromosomes. It carry hereditary from parents to offspring. They direct the synthesis of structure protein and thus help the cell grow, divide and maintain itself. Chromosomes play important role is sex determination, heredity mutation, and evolution.

- **Plasma membrane** - It is the outermost covering of the cell. It is also called cell membrane. It is found in all cells that separate interior cell from the outside cell.
- **Mesosomes** - It is a special membranous structure which is form by extensions of plasma membrane. They help in cell wall formation, DNA replication and distribution of daughter cell.

424. The shape of chromosome is determined by

(a) centrosome (b) centromere
(c) chromomere (d) telomere]

BVP-2008
Uttarakhand PMT-2007
UP CPMT-2001

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Ans. (b) : The shape of chromosome is determined by location of centromere. Chromosomes are the area of chromatin that have been compacted during cell division thread like structure of chromatin reticulum become visible as independent structure through localized contraction.
Telomere-They found at both ends of each chromosome, and protect genome from nucleolytic degradation.

425. The long and short arms of chromosome are designated respectively as
(a) p and q arms (b) q and p arms
(c) m and p arms (d) *l* and s arms
DUMET-2010

Ans. (b) : The long and short arms of chromosome are designated respectively as q and p arms. Here, 'p' refers to 'Petit' which is small arm and 'q' refers to long arm. Both are separated by centromere.

426. Nucleus of Monocystis is :
(a) Bilobed (b) Spherical
(c) Multilobed (d) Bean shaped
Uttarakhand PMT-2004

Ans. (b) : Nucleus of monocystis is spherical. Monocytis is a genes of parasitic protozoa that belongs to the phylum Apicoplexa. They are primarily found in the digestive system of earthworm, where they live as endoparasites.

427. Which of the following is stained using carmine?
(a) Bacteria (b) Diatoms
(c) Chromosomes (d) Viruses
BHU PMT (Screening)-2009
Uttarakhand PMT-2009

Ans. (c) : Chromosome is stained using carmine. carmine is a red-purple in colour. That is obtained from an insect called cochineal belonging to the family Dactylopious due to the aluminium complex, present in the carminic acid, is red in colour. It is used in the production of artificial flowers, paints, cosmetics, medications and inks.

428. Microsatellites are
(a) Repetitive DNA sequences (b) ESTs
(c) YAC (d) BAC
(e) UTR
Kerala PMT-2015

Ans. (a) : Microsatellites are repetitive DNA sequences found in the genome of various organisms. These are sequence of non-coding DNA. The repeating units consists of 1-6 base-pairs of DNA. They are widely used as genetic markers in paternity tests and population genetics studies.

429. Lampbrush chromosomes are seen in which typical stage:
(a) mitotic anaphase (b) mitotic prophase
(c) mitotic metaphase (d) meiotic prophase
JIPMER-2003

Ans. (d) : Lampbrush chromosomes are seen in meiotic prophase stage. Lamp brush chromosomes are found in the nuclei of oocyte of vertebrates like fish, reptiles and amphibians. They appear like a lamp cleaning brush. They are found in the developing occytes of most animals, with the exception of mammals. They were described in 1882 by 'Walther Flemming and Ruckert'.

430. Nucleolus is a :
(a) round structure present near the nucleus in cytoplasm
(b) round structure composed of r-RNA situated in the nucleus
(c) rod-shaped structure present near the nucleus in cytoplasm
(d) none of the above
Punjab MET - 2007
Rajasthan PMT-1998

Ans. (b) : Nucleolus is round structure composed of r-RNA situated in the nucleus. It is found in the nucleus of cell whose primary action is to produce and assemble the cell's ribosomes. It is best known as the site of ribosome biogenesis.

431. Two homologous chromosome are connected at
(a) telomere (b) chromomere
(c) centromere (d) sineptonemal mixture
Rajasthan PMT-1998

Ans. (c) : Two homologous chromosome connected at centromere. It is a constricted region of DNA. Centromere plays an essential role in the segregation of chromosome during the process of the cell cycle in eukaryotic cells. Centromere is the site for attachment of spindle fibre. They play important role in the production of new cell.

432. The space separating the two membranes around the nucleus is called
(a) Endonuclear space (b) Exonuclear space
(c) Matric space (d) Perinuclear space
AMU-1999

Ans. (d) : The space separating the two membranes around the nucleus is called perinuclear space, it describe the distance between the nuclear envelope's inner and outer membranes. It's cells space is about 10-50 nm shape(100Å - 500 Å).

433. Haploid number of chromosomes in a cell are 10, what will be the number of pairs of homologous chromosomes:
(a) 5 (b) 10
(c) 15 (d) 20
Rajasthan PMT-1998

Ans. (b) : Haploid number of chromosomes in a cell are 10, while the number of pair of homologous chromosomes are 10. Two chromosomes of homologous in pair are normally one inherited from the mother and one from the father.

434. The haploid complement of chromosomes of an organism constitutes
(a) genome (b) genotype
(c) phenotype (d) genetic system
CG PMT-2007

Ans. (a) : The haploid complement of chromosomes of an organism is genome. It shows the complete information of an organism which encoded in its DNA. Human have 23 different type of chromosome out of these 22 pair are autosomal chromosomes in addition. There are X and Y chromosomes. Chromosome determines the sex of human.

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A phenotype is described as the observable trait of an organism which is the result of the interaction of genes and environmental factors. It is defined as the sum of observable characteristics of an organism.

435. Micro bodies differ from lysosomes in that

(a) micro bodies are surrounded by a single unit membrane, while lysosome membrane is double
(b) micro bodies are surrounded by double membrane, while lysosome membrane is single unit
(c) micro bodies contain lytic enzymes, while lysosomes do not
(d) lysosomes contain lytic enzymes, while micro bodies do not

CG PMT-2007

Ans. (d) : Microbodies differ from lysosomes because lysosomes contain lytic enzymes, while micro bodies do not contain lytic enzymes. Lysosome show polymorphism.

436. The function of centrosome is

(a) to inhibit cell division
(b) to initiate cell division
(c) to increase protein synthesis
(d) None of the above

BVP-2008
CG PMT-2007

Ans. (b) : The function of centrosome is to initiate cell division. It made up of two perpendicular centrioles a mother and daughter centrioles. They help in cell division and maintain the chromosome number during cell division. Fungi and plants do not relate centrosomes.

437. The chromosomes as thread like structures in nucleus was first described by

(a) Mendel (b) Strasburger
(c) Darwin (d) Levitzky

CG PMT-2007

Ans. (b) : The chromosomes as thread like structures in nucleus was first described by Strasburger (1875).

438. Lamp brush chromosomes are found inside

(a) salivary glands of drosophila
(b) salivary glands of silk moth
(c) oocytes of frog
(d) nucleus of man

CG PMT-2007
JIPMER-2001

Ans. (c) : Lampbrush chromosomes are found inside oocytes of frog, lamp brush chromosomes do not present in mammals. They are largest chromosomes found in the yolk rich oocytes nuclei of certain vertebrates such as fishes, amphibians and reptiles etc. This name is given to it because it is similar in appearance to the brushes used to clean lamp, chimneys in centuries past. It was first observed by Fleming in 1882.

439. Export firm of the body is

(a) Golgi bodies (b) ER
(c) Nucleus (d) Mitochondria

Haryana PMT-2007

Ans. (a) : Export firm of the body is Golgi bodies. Golgi bodies have a factory in which protein received and further processed and sorted for transport to their eventual destinations. Their main function is the packaging and secretion of proteins. It is found in all the eukaryotic cells, plants as well as animals. Golgi complex is also called as traffic police of cell because it performed the direction of movement of substance.

440. The terminal end of chromosomes is called

(a) centromere (b) telomere
(c) chromomere (d) metamere

CG PMT-2009
Manipal-2002

Ans. (b) : The terminal end of chromosomes is called telomere. Telomeare is the polar port of chromosome it prevent the fusion of chromosomal segment to other chromosome.
Cancer cell maintain the telomere length for unlimited growth by telomerase reactivation or a recombination based mechanism.

441. When centromere is present at one end, the chromosome is

(a) metacentric (b) excentric
(c) telocentric (d) apocentric

CMC Ludhiana-2008
J&K CET-2007
AMU-2006

Ans. (c) : When centromere is present at one end, the chromosome is called telocentric or centromere position is terminal and short arm absent. The structure of telocentric chromosomes are rod shaped present in humans. They are found in dense and constricted region in a chromosome. It contains repetitive DNA sequences.

442. The exchange of one part of a chromosome to the other part of same or another chromosomes is called :

(a) linkage (b) translocation
(c) mutation (d) inversion

JIPMER-2001

Ans. (b) : The exchange of one part of a chromosome to the other part of same or another chromosomes is called translocation. When chromosomal segment is transferred from one place to another then chromosomal translocation occurs such types exchanging from one place to another is cause of infertility or cancer. Schizophrenia, muscular dystrophy and Down syndrom.

443. A nucleus pulposus is found in:

(a) skull (b) pelvic girdle
(c) neuron (d) intervertebral disc

Haryana PMT-1999

Ans. (d) : A nucleus pulposus is found in inter-vertebral disc. This disc act as cushions in between vertebrae. The spinal canal that contain spinal nerve, is directly behind the disc and the vertebral bodies.
Pelvic girdle – It's structure is ring like bony structure. It is located in the lower part of the trunk. It connects the arial skeleton to lower limbs.
Skull – The bones that surround and protect the brain is called skull. It is composed of 22 bones.
Neuron– It is responsible for receiving and sending neuro-transmitters. It is a functional unit of nervous system.

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444. Four different types of chromosomes but of the same size are sequenced as:
(a) telocentric, metacentric, acrocentric submetacentric
(b) metacentric, acrocentric, submetacentric telocentric
(c) metacentric, submetacentric, acrocentric telocentric
(d) metacentric, telocentric, acrocentric, submetacentric

Haryana PMT-1999

Ans. (c) : Four different types of chromosomes but of the same size are sequenced as metacentric, sub-metacentric, acrocentric, and telocentric

445. When the chromosome has a centromere nearer to one end of the chromosome resulting into one shorter and one longer arm, the chromosome is termed as
(a) metacentric (b) sub-metacentric
(c) acrocentric (d) telocentric

AMU-2012

Ans. (b) : When the chromosome has a centromere nearer to one end of the chromosome resulting into one shorter and one longer arm, the chromosome is termed as sub-metacentric. It is a chromosome whose centromere is little away from the middle of the chromosome. The arms of chromosomal are unequal in length.

446. The controlling centre of cell is
(a) Nucleus (b) Nucleolus
(c) Mitochondria (d) Ribosome

MGIMS Wardha-2011

Ans. (a) : The controlling centre of cell is Nucleus. Nucleus contain the chromosomes. Nucleus as a cell organelle was first described by Robert Broun as early as 1831. Later the material of the nucleus stained by the basic dyos was given the name chromatin by flemming.

447. The longest chromosome is seen in
(a) Allium (b) Lilium
(c) Trillium (d) Zea mays

J&K CET-2007

Ans. (c) : The longest chromosome is seen in Trillium. It is measured 30 mm in length.
Lilium : It is a flower plants that is a genus of herbaceous flowering plants belonging to family liliaceae.
Allium : It is a flower plants that is a genus of monocotyledonous flowering plants with hundreds of species belonging to family Amaryllidaceae.

448. Nuclear membrane is continuous with
(a) rough endoplasmic reticulum
(b) smooth endoplasmic reticulum
(c) cell membrane
(d) Golgi bodies

Rajasthan PMT-2009

Ans. (a) : Nuclear membrane is continuous with rough endoplasmic reticulum. The inner and outer nuclear membrane is directly connected with the lumen of the endoplasmic reticulum. Nuclear membrane have pore which attached to RER and pass ribosomal subunits.

449. Structure of nuclear membrane helps in
(a) organisation of the spindle
(b) synapsis of homologous chromosome
(c) nucleo - cytoplasmic exchange of material
(d) anaphasic separation of daughter chromosome

UPCPMT-2002
VMMC-2007

Ans. (c) : Structure of nuclear membrane helps in nucleo-cytoplasmic exchange of material. It separates the nucleoplasm from the cytoplasm. The nuclear pore complex are very specific and made up of 30 different protein called nucleoprotein. The nuclear pore complex is help in transport of material from nucleus to cytoplasm and vice-versa.

450. Centromere is also called :
(a) chromomere
(b) secondary constriction
(c) primary constriction
(d) chromocentre

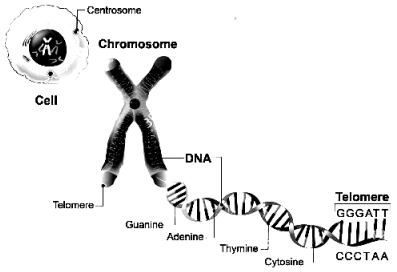
BCECE-2003

Ans. (c) : Centromere is also called primary constriction, from a mitotic chromosome structure. Where two identical sister chromatids are most closely in contact. In primary construction sister chromatids appear most tightly paired.
Secondary constriction : It is not present in all chromosomes. It plays an important role in karyology and cytology.

451. Telomere repetitive DNA sequences control the function of eukaryote chromosomes because they:
(a) Prevent chromosome loss
(b) Act as replicons
(c) Are RNA transcription initiator
(d) Help chromosome pairing

AIPMT-2007

Ans. (a) : • Telomeres are region of repetitive nucleotide sequence associated with specialized protein at the end of linear chromosomes.
They are wide spread genetic feature most commonly found in eukaryotes.
Telomeres act as cap that protect the internal regions of the chromosomes, and they are worn down round of DNA replication.



452. The part of chromosome beyond the secondary constriction is known as
(a) Telomere (b) Centromere
(c) Chromomere (d) satellites

VMMC-2014
AP EAMCET-2001
UP CPMT-2014

@apna_pdf

Ans. (d): Satellite chromosome are chromosome that contain secondary constructs that serve as identification. They are observed in arocentric chromosomes

Terminal part of chromosome, i.e., end of chromosome is known as telomere.

Centromere - The two chromatids are attached to each other by a narrow area called centromere or primary constriction.

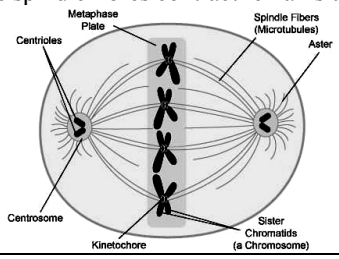
Chromomere is one of the small bead- shaped and heavily staining masses of coiled chromatin that are linearly arranged along the chromosome.

453. Spindle fibre unite with which structure of chromosomes:

(a) Chromocentre (b) Chromomere
(c) Kinetochore (d) Centriole

AIPMT-2000

Ans. (c) : Kinetochore is a protein like structure that occur on a chromatid during cell division and allows to attached a spindle fiber on chromosome. Chromosomes being attached to the J shaped spindle fibres by their centromeres. Two types of spindle fibres can be distinguished as the interpolar fibre, which stretches from the pole to the centromers (kinetochore) of an individual chromosome. The mechanism, by which the chromosomes move and the spindle fibres contract remains unclear.



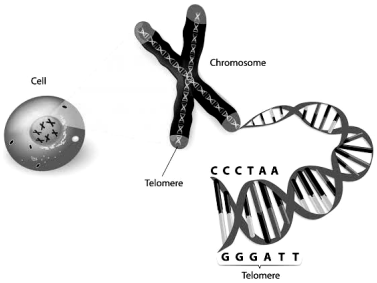
454. Function of telomeres in nucleus:

(a) Pole ward movement
(b) To initiate the RNA synthesis
(c) To seal the ends of chromosome
(d) To recognize the homologous chromosome

AIPMT-2000

Ans. (c) : Telomeres are controlled by the presence of the enzyme telomerase. A telomere is a repeating DNA sequence (for example, TTAGGG) at the end of the chromosomes.

Telomeres act as cap that protect the internal regions of the chromosomes, and they are worn down round of DNA replication. They also stop chromosomes from fusing with each other.

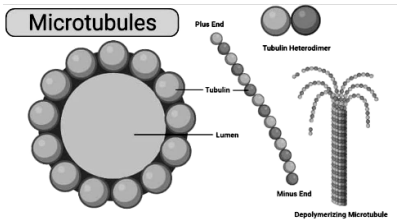


455. Role of microtubules :

(a) To help in cell division
(b) Cell membrane formation
(c) Respiration
(d) Pinocytosis

AIPMT-1998

Ans. (a) :



Microtubules are thread like structures and part of cytoskeletion that provide structural support to the cell

- They are made up of tubulin protein.
- They also help in cellular movements and movements of chromosomes during cell division by forming spindle and astral ray. They play role in cell differentiation and determination of polarity

456. Microtubules absent in : -

(a) Mitochondria (b) Flagella
(c) Spindle fibres (d) Centriole

AIPMT-2001

Ans. (a) : Microtubules are absent in mitochondria. Mitochondria are double membrane, semiautonomous eukaryotic cell organells whose function is cellular respiration.

Microtubules are present in centriole, flagella and spindle fibers.

457. The scientific term which is not related to the primary constriction of a chromosome is:

(a) centromere (b) kinomere
(c) kinetochore (d) chromomere

AP EAMCET-1999

Ans. (d) : Centromere, Kinomere Kinetochore all are the site of primary constriction of a chromosomes.

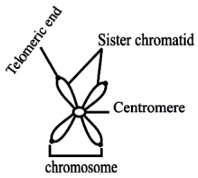
Chromomer are regions of chromatin that have been compacted through localized constriction.

458. Which of the following occurs more than one and less than five in a chromosome

(a) Chromatid (b) Chromomere
(c) Centromere (d) Telomere

AIPMT-2002

Ans. (d) : Two sister chromatids are joint by the centromere to form one chromosome



- One chromosome have one centromere.
- Each chromatid have one telomeric end. According to the question telomere is correct answer. The telomere present each chromatic end.

459. The term nucleolus was coined by:

(a) R. Brown (b) R. Hooke
(c) Bowman (d) Hanstein

AFMC-2001

@apna_pdf

Ans. (c) : The term nucleolus was coined by Bowman but first described by Fontana in 1781. Nucleolus is produced by nucleolar organizing Region (NOR) of chromosome. Nucleolus is place of formation of ribosome.

460. In nucleoplasm, a spherical body attached to particular chromosome on a definite position is called

(a) nucleolus (b) karyolymph
(c) plasmid (d) reticulum

BHU PMT (Mains)-2010

Ans. (a) : Nucleoplasm is a spherical body attached to particular chromosome on definite position is called nucleolus. It is largest nuclear organelle .It is primary site of ribosome subunit biogenesis in eukaryotic cells.

461. Plant and animal cells, both have in common:

(a) cell membrane and nucleolus
(b) cells membrane and cell wall
(c) nucleolus and chloroplast
(d) nucleus and cell wall

BVP-2005

Ans. (a) : Cell membrane and nucleolus are common organelles present in both plant & animal cell. Cell membrane also known as plasma membrane or plasmalema & found in all cells. It consists of lipid bilayer & regulates transport of materials.

462. Two sister chromatids are attached with :

(a) spindle fibre (b) centromere
(c) chromocentre (d) chromatid

BVP-2000

Ans. (b) : Two sister chomatids are held together at a constricted region of chromosome called centromere. Centromere is the region where microtubules are organized & form spindle fibres.

463. Genetically active area of chromosome is called

(a) euchromatin (b) heterochromatin
(c) heptan (d) cistron

BVP-2000

Ans. (a) : In 1928, E. Heitz coined the term euchromatin and Heterochomatin to describe the parts of chromatin that are less coiled & those remain highly coiled condensed euchromation is transcriptionally active & protein coding genes. Euchomatic regions have accessible structures characterized by histone acetylation, methylation at H3K4 and H3K9.

464. Chromosomes with equal arms are called:

(a) metacentric (b) telocentric
(c) acentric (d) polycentric

AIIMS-2000

Ans. (a) : Chromosome with equal arms called metacentric chromosome. Metacentric means centromere present at middle of chromosome.

- Sub metacentric refers to centromere slightly away from middle of chromosome.
- Acrocentric means centromere present near the end of chromosomes.
- Telocentric means centromere present at the tip.

465. Which is distributed more widely in a cell?

(a) DNA (b) RNA
(c) Chloroplasts (d) Sphaerosomes

AIPMT-1992

Ans. (b) : DNA and RNA are two types of nucleic acids. DNA gets converted into RNA by the process of transcription. m-RNA, t-RNA and r-RNA are the three types of RNA. It widely distributed in the cell cytoplasm.

466. In salivary gland chromosomes/polytene chromosomes, pairing is:

(a) Absent
(b) Occasional
(c) Formed between non-homologous chromosomes
(d) Formed between homologous chromosomes.

AIPMT-1993

Ans. (d) : In salivery gland chromosomes/polytene chromosomes, pairing is formed between homologous chromosomes. A characteristics feature of these chromosomes is that somatic pairing occurs in them and hence their number appears half of normal somatic cells. Polytene chromosomes develop from the hromosomes of diploid nucleic by successive duplication of each chromosomal element without their segregation.

467. Lowest number of chromosomes are found in :

(a) Haplopappus (b) Cyprus
(c) Salix (d) None of these

Punjab MET-2006

Ans. (a) : Haplopappus gracilis have lowest number of chromosomes, i.e. [2n = 4]. Its common name is slender golden weed. Highest number of chromosomes are found in ophioglossum reticulatum [n = 630](Pteridophyte).

468. A conspicuous rounded body present in nucleoplasm and attached to a particular chromosome at a definite place is

(a) plasmid (b) karyolymph
(c) nucleolus (d) nuclear reticulum

Punjab MET-2007

Ans. (c) : Nucleoplasm is a spherical body attached with nucleolar organizing chromosome on definite position is called nucleolus. It is largest nuclear organelle & primary site of ribosome subunit biogenesis in eukaryotic cells.

469. In the given diagram I and II indicate

s

(a) Chromomere and chromonemata
(b) Centromere and secondary constriction
(c) Secondary constriction and satellite
(d) Telomere and satellite

MHT CET-2015

Ans. (d) : In the given diagram I represent terminal end of chromosome i.e. telomere while II represents secondary constriction or satellite

@apna_pdf

470. The chromosome with centromere near the end is called____

(a) Acrocentric (b) Metacentric
(c) Sub-metacentric (d) Telocentric

MHT CET-2014

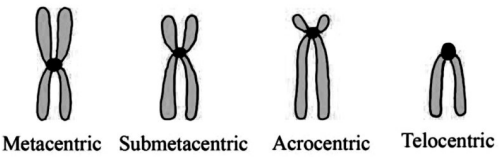
Ans. (a) : Acrocentric - The centromere is present near the end of chromosomes one extremely short and one very long arms.

Metacentric - Chromosome have a Centromere in the middle of chromosome and divided the chrosome into two equal arms the shape of the metacentric chromosome is V shape.

Submetacentric Chromosome - Centromere slightly away from the middle forming one shorter arm and one longer arm. it is an L - shaped chromosome most chromosomes in humans are submetacentric, and X chromosome also found.

Telocentric Chromosome-It is not observed in human. They have centromere present at the end of the chromosome. The shorter arm is rarely visible, shape of the chromosome at anaphase is like the letter rod like or I shape.

Types of Chromosomes



471

(a) centriole (b) kinetochore
(c) chromocentre (d) chromomere

BCECE-2001
WB JEE-2007

Ans. (b) : Knetochore is disc shaped protein structure associated with duplicated chromatids in eukaryotic cells where spindle fibres attach during cell division to pull sister chromatids. It is a large protein that connects chromosomes to microtubules of mitotic & meiotic spindles to distribute replicated genome from mother cell to its daughter cells.

472. Lampbrush chromosomes are seen in:

(a) interphase (b) zygotene
(c) diplotene (d) metaphase

JCECE-2014
Rajasthan PMT-1999
DUMET-2006

Ans. (c) : Lampbrush chromosomes was first observed by flemming in 1882 in amphibian oocytes. It develops during diplotene stage of meiotic prophase during oogenesis in oocytes of all vertebrates as well as invertebrates. These are meiotic bivalent, consisting of 2 pairs of sister chromatids held together by chiasmata. Due to pair of loops these chromosomes appears like lampbrush and hence called lampbrush chromosomes.

473. One key function of nuclear pores is to

(a) aid in the production of new nuclei
(b) allow cells to communicate with each other
(c) form connections between different organelles
(d) allow molecules like protein to move in and out of the nucleus

MGIMS Wardha-2015

Ans. (d) : Bidirectional transport of molecules occurs through nuclear pore between cytosol and nucleus. RNA molecules and ribosomal subunits are exported to cytosol while all proteins that functions in nucleus are synthesized in cytosol and then imported. Proteins imported to or exported to nucleus through nuclear pores contains specific amino acid sequence that acts as "Nuclear locolization signals"

474. The function of glyoxysome is :

(a) protein metabolism
(b) carbohydrate metabolism
(c) fat metabolism
(d) protein synthesis

DUMET-2002

Ans. (c) : In plants, glyoxisomes (type of microbodies) plays an essential role in converting fatty acids stored in germinating seeds. It contains enzymes for glyoxylate cycle through which fats are converted into carbohydrates (gluconeogenesis).

475. The function of peroxisomes is :

(a) H_2O_2 destruction
(b) conversion of fat to carbohydrates
(c) detoxification of heavy metals
(d) oxidative phosphorylation

WB JEE-2015
DUMET-2002

Ans. (a) : Peroxisomes provide protection against photo-oxidative damage. In photorespiration, glycolate transported from chloroplast into peroxisome then glycine glycolte is converted first into glyoxylate and acts to H_2O_2 to destruct. peroxisomes take part in oxidative process like reduction of reactive oxygen species eg. H_2O_2. Luciferase enzyme generating light in fire flies is also present in peroxisomes.

476. Who discovered the glyoxysome?

(a) Jenssen and Jenssen (b) Tolbert
(c) Beevers (d) Purkinje

Rajasthan PMT-1997

Ans. (c) : Harry Beever discovered glyoxysomes in 1961. Glyoxysomes are specialized peroxisomes found in plants and fungi, seeds that contain fats oils. Glyoxysomes are microbodies which occur in β oxidation of fatty acid, perform glycolate cycle, protect plant from photo-oxidation by catalase enzyme.

477. A animal cell lacks nucleus. Which one will also be absent in it?

(a) Ribosome (b) Chromosome
(c) Lysosome (d) Centriole

BVP-2014

Ans. (b) : Nucleus is primary carrier of hereditgry. In 1953 (Hammerling) conducted experiments on Acetabularia and proved that nucleus plays an important role in heredity. It can be divided into 4 parts-nuclear membrane, nucleoplasm, chromatin/ chromosomes & nucleolus.
In absence of nucleus, chromosomes also absent.

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478. Which of the following does not contain DNA?
(a) Mitochondria (b) Chloroplast
(c) Peroxysome (d) Nucleus
BVP-2009
Rajasthan PMT-1997 / VMMC-2009

Ans. (c) : Peroxysomes are small, membrane enclosed orgamelle that contain enzymes involved in variety of metabolic reactions. Peroxisomes do not contain their own genomes, but mitochondria, chloroplast and nucleus are have DNA material.

479. Nucleus was discovered by:
(a) Robert Brown (b) Robert Hooke
(c) Leeuwenhoek (d) None of the above
J&K CET-2001

Ans. (a) : Nucleus is also known as karyon its study is known as karyology. It was discovered by an English Botanist Robert Brown in 1831. It is the primary carrier of hereditary material. Hammerling proved by its experiments that nucleus is the key of heredity by using Acetabutaria. Robert Hook discovered the cell wall.

480. A student wants to study metaphasic behavior of chromosomes in a living cell. The technique most suitable is :
(a) phase contrast microscope
(b) x-ray microscope
(c) cell fractionation
(d) scanning electron microscope
MGIMS Wardha-2006

Ans. (a) : It is an option microscopy technique that converts phase shift in light passing through transparent specimen to brightness change in image phage contrast microscopy makes highly transparent object. The cells can be observed in natural state by this microscopy.

481. Which cell organelle would not originated by endosymbiosis?
(a) Mitochondria (b) Flagella
(c) Nucleus (d) Chloroplasts
JCECE-2014

Ans. (c) : Endosymbiotic theory states that some eukaryotic cell organelles like mitochondria, chloroplast, flagella, plastid evolved from free- living prokaryotes. This hypothesis states that they have nucleic acid & originated independent- free living organism. Nucleus is not originated by endosymbiosis.

482. A chromosome having sub-terminal centromere is called
(a) telocentric (b) acrocentric
(c) metacentric (d) sub-metacentric
CG PMT-2004

Ans. (b) : A chromosome having sub-terminal centromere is called acrocentric. Acrocentric means centromere present near the end of chromosomes.
- Metacentric means centromere present at middle of chromosome.
- Sub metacentric refers to centromere present slightly away from middle of chromosome.
- Telocentric means centromere present at the tip.

483. Who coined the term 'chromosome'?
(a) Balbiani (b) Waldeyer
(c) Sutton (d) Purkinje
CG PMT-2004

Ans. (b) : The term "Chromosome" was given by "W. Waldeyer" in 1888. Chromosome is a DNA molecule that contains genetic material for an organism chromosomal structure is composed of DNA and special proteins to form dense, coiled structure.

484. Structure present over the chromosomes is
(a) nucleolus (b) centromere
(c) centrosome (d) Golgi complex
CG PMT-2004

Ans. (b) : Centromere is also called kinetochore. It is the primary constriction at which spindle attaches during cell division. It is the last part to get duplicated in dividing chromosomes. Centromere contains highly repeated satellite DNA. Position of centromere describes shape of chromosomes.

485. Which of the following is stained using carmine?
(a) Bacteria (b) Diatoms
(c) Chromosomes (d) Viruses
BVP-2009

Ans. (c) : Carmine is the basic dye used to stain nucleic acid and chromosomes given pink colour. Acetocarmine is saturated solution of carmine in 45% acetic acid used for sapid staining of fresh unfixed chromosomes. It is used to study stages of cell division. Carmine is prepared by coccus cacti(insect)

486. Membrane is absent in
(a) nucleus (b) nucleolus
(c) vaculoe (d) lysosome
JIPMER-2011 / AIPMT-1992

Ans. (b) : Nucleolus described by F. Fontana. It is a non-membrane bound structure which disappears in late prophase & reappears in Telophase stage of cell division. Each nucleolus is produced by a Nucleolar organizing Region [NOR] of a chromosome.

487. Within the nucleus, DNA is organized along with proteins into material called :
(a) nuclear lamina (b) chromatin
(c) chromosome (d) chromatid
Punjab MET-2005

Ans. (b) : Chromatin is the suspended material of nucleoplasm. It is the interphase chromosomal material, complex between eukaryotic DNA and protein. Protein of chromatin containing high proportion of basic amino acids and facilitate binding with DNA.

488. Which of the following features is/are correct for heterochromatin of eukaryotic nucleus?
(a) It is highly expanded in interphase
(b) It stains densely with basic dyes
(c) It is highly condensed in interphase
(d) Both B and C
WB JEE-2015

Ans. (d) : In 1928, E. Heitz coined the term euchromatin and Heterochomatin to describe the parts of chromatin that are less coiled and those remain highly coiled condensed. In a typical nucleus. Some regtion of chromatin are loosely packed (and stains light) are referred to as euchromatin. The chromatin that is more densely packed and stains dark are called as Heterochromatin. Euchromatin is said to be transcriptionally active chromatin, whereas heterochromatin is inactive.

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09 BIOMOLECULES

A. Analysing and Composition

1. Simplest amino acid is :

(a) glycine (b) proline
(c) tryptophan (d) leucine

NEET-2020 phase- I
AP EAMCET-2011
JIPMER-2010, 2007
WBJEE-2007
AIPMT-2005
HARYANA PMT-2001
AFMC-2000

Ans. (a) : Glycine is a simplest amino acid.

• Proline is non essential amino acid, which means that it is manufactured from other amino acid in the liver, it does not have to be obtained directly through the diet.

Tryptophan is an amino acid needed for normal growth in infant and for the production and maintenance of the body's proteins, muscles, enzymes and neurotransmeter.

• Leucins is one of the 3-essential branched chain amino acids.

2. Match List-I and List-II with respect to proteins and their functions and select the correct option.

List-I	List-II
Collagen	p. Fight infectious agents
Trypsin	q. Hormone
Insulin	r. Enzyme
Antibody	s. Intercellular ground substance

(a) 1-s, 2-p, 3-r, 4-p (b) 1-q, 2-r, 3-q, r-s
(c) 1-s, 2-q, 3-r, 4-p (d) 1-s, 2-r, 3-q, 4-p

Karnataka CET-20.05.2023

Ans. (d) : The correct match is (d) – 1-s, 2-r, 3-q, 4-p

• Collagen – Intercellular ground substance. (It provides strength and elasticity to tissues).

• Trypsin – Enzyme (digestive enzyme that breaks down protein into smaller molecules).

• Insulin – Hormone (regulates blood sugar levels).

• Antibody – Fight infections agent (fight against foreign invaders such as bacteria, virus).

3. The biomolecules which are acid insoluble fraction and molecular weight more than 10000 daltons are

(I) Polysaccharides
(II) Nucleic acids
(III) Lipids
(IV) Proteins

(a) I, III, IV (b) II, III, IV
(c) I, II, III (d) I, II, IV

TS EAMCET-10.05.2023, Shift-II

Ans. (d) : Polysaccharides, nucleic acids and proteins are all beiomolecules with molecular weight more than 10,000 daltons.

• Lipid have molecular weight less than 10,000 daltons but they are still found in the acid insoluble fraction because they form aggregates that are insoluble in water.

4. Match the following

List-I		List-II	
A.	Potassium	1.	Constituent of ferredoxin
B.	Sulphur	2.	Necessary in stomatal movement
C.	Molybdenum	3.	Needed for auxin synthesis
D.	Zinc	4.	Component of nitrogenase

(a) A – III, B – I, C – II, D – IV
(b) A – I, B – IV, C – II, D – III
(c) A – II, B – I, C – IV, D – III
(d) A – III, B – I, C – IV, D – II

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : The correct match is (c) : A – II, B – I, C – IV, D – III

A.	Potassium	II.	Necessary in stomatal movement
B.	Sulphur	I.	Constituent of ferredoxin
C.	Molybdenum	IV.	Component of nitrogenase
D.	Zinc	III.	Needed for auxin synthesis

5. Find the wrong statements

A. Polymers of polysaccharides, fats and proteins are synthesized from monomers by ionic bonding
B. Molecules with polarheads and hydrophobic tails are present in cell membrane
C. Left end of protein chain is N- terminal end
D. Right and left handed helices are observed in protein

(a) A & B (b) B & C
(c) C & D (d) A & D

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : • Molecules with polarheads and hydrophobic tails are present in cell membrane.

• Left end of protein chain is N-terminal end which contain amino group (NH_2). The C-terminal end of a protein is contain carboxyl group (COOH).

Explanation for wrong statement are–

A. Polymers of polysaccharides, fats and proteins are not synthesized from monomers by ionic bonding. They are formed through different chemical reactions like dehydration synthesis or hydrolysis.

D. Protein primarily exhibit right-handed helices (alpha helices). Left-handed helices in protein are rare.

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6. Match the following

List-I	List-II
(A) Pollen germination	**(i) Sulphur**
(B) Synthesis of Ausins	**(ii) Calcium**
(C) Stabilization of protein structure	**(iii) Boron**
(D) Synthesis of cell wall	**(iv) Zinc**

(a) A – iii, B – ii, C – i, D – iv
(b) A – iii, B – iv, C – i, D – ii
(c) A – ii, B – iv, C – iii, D – i
(d) A – ii, B – iii, C – iv, D – i

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : The correct match is (b) : A – iii, B – iv, C – i, D – ii

A. Pollen germination	–	Boron.
B. Synthesis of Auxins	–	Zinc.
C. Stabilization of protein structure	–	Sulphur.
D. Synthesis of cell wall	–	Calcium.

7. Match the following

List - I	List - II	List - III
(I) Palmitic acid	(A) Arthopod	(i) Protein
(II) GLUT - 4	(B) Cotton fibre	(ii) Complex polysaccharide
(III) Chitin	(C) 16C	(iii) Amino sugar
(IV) Cellulose	(D) Glucose transport	(iv) High no. of $-CH_2$ Groups

(a) I C iv, II D i, III A ii, IV B iii
(b) I B iii, II A iv, III D ii, IV C i
(c) I D iii, II C i, III A ii, IV B iv
(d) I B iv, II D iii, III C i, IV A ii

AP EAPCET-23.05.2023, Shift-I

Ans. (a) :

- **Palmitic Acid–** It is saturated fatty acid with 16-carbon atom. It is a major component of animal fats and oils.
- **GLUT-4–** It is a glucose transporter protein that is found in muscle and fat cells. It is responsible for transporting glucose into these cells.
- **Chitin–** It is a polysaccharide that is found in the exoskeletons of arthropods and the cell walls of fungi. It is made up of repeating unit of N-acetylglucosamine.
- **Cellulose–** It is a polysaccharide that is found in plant cell walls. It is made up of repeating units of glucose.

8. Study the given statements and select the correct options ?

(i) Carbohydrates, proteins, nucleic acids and lipids are primary metabolites.
(ii) Alkaloids, flavonoids, rubber etc. are secondary metabolites.
(iii) Linoleic, linolenic and palmitic acids are the three essential fatty acids.

(a) Statements (i) & (ii) are correct
(b) Statements (i) & (iii) are incorrect
(c) Statements (i) & (iii) are correct
(d) Only statements (ii) is correct

AP EAMCET-03.09.2021 Shift-II

Ans. (a) : Carbohydrates, proteins, nucleic acids and lipids are primary metabolites as they have identifiable functions. Alkaloids, flavonoids, rubber are secondary metabolites present in plants. Essential fatty acids are those which have a good requirement by our body but it cannot produce them e.g. linoleic acid, Omega-6-fatty acid linolenic acid Omega-3-fatty acid whereas Palmitic acid is non-essential fatty acid.

9. Which one of the following amino acids is least likely to be in the core of a protein?

(a) Phenylalanine (b) Valine
(c) Isoleucine (d) Arginine

KVPY SB & SX-2019

Ans. (d) : Arginine is a charged amino acid, which is generally found at surface but phenyalanine, luccine and valine amino found at core of protein since they do not interact with water.

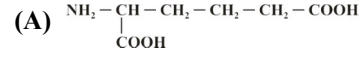
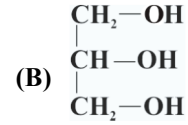
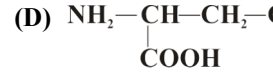
10. The amino acid _____ is directly used as the precursor in the formation of indole acetic acid.

(a) glutamic acid (b) alanine
(c) tyrosin (d) tryptophan

Tripura JEE-2019

Ans. (d) : In the formation of indole acetic acid is used by **tryptophan**.
Alanine is second simplest α- amino acid.
Tyrosin (Try, Y) is a precursor to neurotranemitters.
Glutamic acid is α- amino acid & is used in biosynthesis of protein in all living being.

11. Match the following structures with their correct names

List - I	List - II
(A) 	**i. Fatty acid**
(B) 	**ii. Serine**
(C)	**iii. Glycerol**
(D) 	**iv Glutamic acid**
	v. Alanine

The correct is match is :

	(A)	(B)	(C)	(D)
(a)	iv	ii	iii	i
(b)	iv	iii	i	ii
(c)	i	iv	iii	v
(d)	iii	i	iv	v

TS EAMCET-09.05.2019 Shift-I

Ans. (b) : List -I List-II

(A) $NH_2-CH-CH_2-CH_2-COOH$ (COOH below) — Glutamic acid

(B) CH_2-OH, $CH-OH$, CH_2-OH ——— Glycerol

(C) $CH_3-(CH_2)16$ —— COOH ——— Fatty acid

(D) $NH_2-CH-CH_2-OH$ (COOH below) —— Serine

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12. Which one group of biological molecule are micro and macromolecule respectively?
(a) DNA and lipids
(b) Lipids, RNA and proteins
(c) Lipids and polysaccharides
(d) Amino acids and lipids

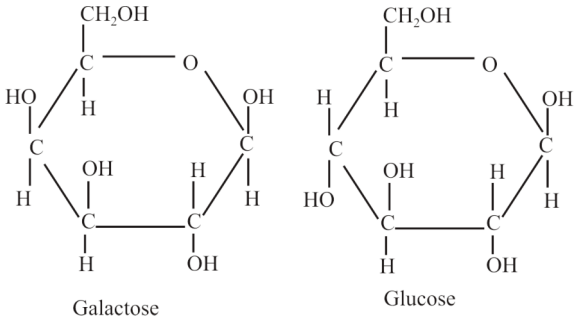
UP CPMT-2014

Ans. (b): Biomolecule, also called biological molecule, are any of numerous substances that are produced by cells and living organisms. The four major types of biomolecules are carbohydrates, lipids, nucleic acids and proteins. Carbohydrates are macromolecules. Lipids are not strictly macromolecules. Proteins and nucleic acid are macromolecules.

13. Lactose is composed of
(a) glucose + glucose
(b) glucose + galactose
(c) glucose + fructose
(d) fructose + galactose

JIPMER-2013

Ans. (b) :



It is a disaccharide composed of one molecule of glucose and one molecule of galactose. Lactose is properly known as milk sugar. Lactose is formed by beta 1,4 condensation of two hexose molecules.

14. 'Elicitors' are molecule which stimulate production of
(a) Primary metabolites
(b) Secondary metabolites
(c) Tertiary metabolites
(d) All metabolites

CG PMT-2010

Ans. (b) : Elicitors are molecule which stimulate production of secondary metabolites. Elicitors are molecules that are released by plants in response to infection or injury. They can also be produced by microorganism.

Elicitor triggers the hypersensitivity in plant. Elicitors are classified into two types i.e. pathogen derived elicitors (exogenous elicitor) and plant derived elicitors (endogenous elicitor).

15. Most abundant mineral of animal body is
(a) iron (Fe) (b) sodium (Na)
(c) potassium (K) (d) calcium (Ca)

WB JEE-2010

Ans. (d) : Most abundant mineral of animal body is calcium. It is an important constituent of bone and teeth where it provides hardness and structural strength.

16. Carbohydrates, the most abundant biomolecules on earth, are produced by –
(a) Some bacteria, algae and green plant cells
(b) All bacteria, fungi and algae
(c) Fungi, algae and green plants cells
(d) Viruses, fungi and bacteria

AIPMT-2005

Ans. (a) : Carbohydrate is the most abundant biomolecules on earth.

- Carbohydrate compound synthesized in the chlorophyll containing cells of some bacteria, algae and green plants during photosynthesis.
- Photosynthesis is a process of generating the food for green plants and other organisms. It involves the conversion of light energy, normally from the sun, into chemical energy in form of ATP.

17. The major role of minor elements inside living organisms is to act as: -
(a) co-factors of enzymes
(b) Building blocks of important amino acids
(c) Constituent of hormones
(d) Binder of cell structure

AIPMT-2003

Ans. (a): The major role of minor elements inside living organisms is to act as co-factors of enzymes. Minor nutrients are also known as **micro-elements or trance elements**. They are present in plants in very small quantities. However, they can be toxic to plants if it is present in a large amount. These nutrients are zinc, iron, boron etc.

18. Match the biological molecules listed under column I with their Biological functions listed under column II; choose the choice which gives correct combination of alphabets of the two columns:

Column –I (Biological molecules)	Column –II (Function)
A. Glycogen	**p. Hormone**
B. Globulin	**q. Biocatalyst**
C. Steroids	**r. Antibody**
D. Thrombin	**s. Storage product**

(a) A = r, B = q, C = s, D = p
(b) A = s, B = q, C = p, D = r
(c) A = q, B = s, C = r, D = p
(d) A = s, B = r, C = p, D = q

Karnataka CET-2001

Ans. (d) :

Column–I (Biological molecules)	Column –II (Function)
A. Glycogen	s. Storage product
B. Globulin	r. Antibody
C. Steroids	p. Hormone
D. Thrombin	q. Biocatalyst

19. The most abundant molecule in cell is
(a) water (b) carbohydrate
(c) lipid (d) protein

DUMET-2011

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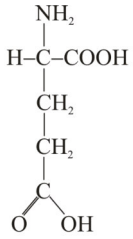
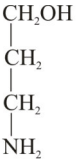
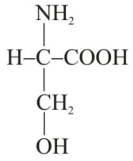
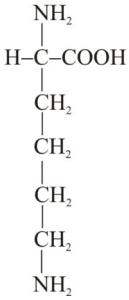
Ans. (a) : The most abundant molecule present in the cell is called water. It is around 70% of total cell mass. Water makes up 62% of the cell, followed by fat (16%), protein (16%), minerals (6%), and carbohydrate (less than 1%).

20. Which one out of (a) to (d) given below correctly represents the structural formula of the basic amino acid?

(a) 

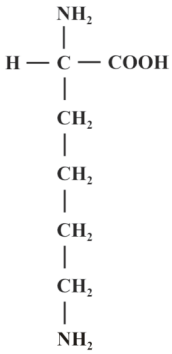
(b) 

(c) 

(d) 

JIPMER-2013
AIPMT-2012

Ans. (d) :



Lysine (Lys, K)

- Amino Acid is made up of two functional group namely $-NH_2$ and COOH amino acid substituted by methanes.
- The – COOH stands for the carboxylic Acid group & $-NH_2$ stands for amino acid. It is an organic compound containing one or more amino groups together with one or more carboxylic acid groups in a molecules. The basic amino acid are arginine (Arg), Lysine (Lys) and histidine (His)

21. Cereal proteins are deficient in one of the following amino acid

(a) Methionine (b) Threonine
(c) Lysine (d) Glutamic acid

CG PMT-2010

Ans. (c) : Cereals protein are deficient in several amino acid such as tryptophon, threonin and lysine.

22. Which amino acids are present in histones?

(a) Lysine and histidine
(b) Valine and histidine
(c) Arginine and lysine
(d) Arginine and histidine

Rajasthan PMT-2011

Ans. (c) : Arginine and lysine are amino acids are present in histones. Histones are the alkaline protine which wrapped DNA into a condensed form.

23. Separation of amino acid and carboxylic groups is called

(a) deamination (b) excretion
(c) egestion (d) transamination

VMMC-2007
Rajasthan PMT -2005
UPCPMT-2002

Ans. (a) : Separation of amino Acid and carboxylic group is called deamination.
It involves the removal of the amino group from the amino acid, producing ammonia and a keto acid. The ammonia is converted to urea and excreted, while the keto acid can enter metabolic pathway.

24. Which of the following is polymerized to form proteins?

(a) Protein (b) Carbohydrates
(c) Amino acid (d) Muramic acid

HP CET-2012
VMMC-2004

Ans. (c) : Amino acid is polymerized to form proteins. It is formed by various folded linear polymers of amino acids. The polymer of amino acids is called as poly peptides.

25. Choose the correct non-protein amino acid

(a) hydroxyproline (b) hydroxylysine
(c) cystine (d) γ-amino butyric acid

WB JEE-2009
JCECE-2012

Ans. (d) : γ- amino butyric acid is a non-protein amino acid.

26. Sulphur containing amino acids are

(a) valine, lysine and cystine
(b) tryptophan, glutamic acid and aspartic acid
(c) citrulline, methionine and glumeric acid
(d) cysteine, cystine and methionine

BVP-2014, 2010

Ans. (d) : Sulphur containing amino acid are cysteine, cystine and methionine.
Cysteine is a non-essential amino acid important for making protein, and for other metabolic functions.
Cystine is amino acid that is found digestive enzyme, in the cell of the immune system.
Methionine is an aliphatic, sulphur containing essential amino acid.

27. Which one of the following can be used to detect amino acids?

(a) Iodine vapour (b) Ninhydrin
(c) Ethidium bromide (d) Bromophenol blue

KVPY SB & SX-2015

Ans. (b) : Ninhydrin is a chemical solution that is used to detect both primary or secondary amino acid.

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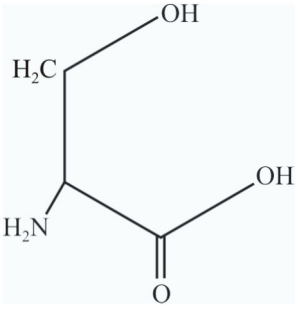
28. Which of the following amino acids has hydroxyl methyl group as its R group?

(a) Serine (b) Proline
(c) Alanine (d) Arginine

DUMET-2010

Ans. (a) : The amino acid serin has its R group with a hydroxyl group attached to a CH_2 (methyl) group.



SERINE [α-amino-β-hydroxy butyric Acid]

29. Before cellular respiration, amino acid undergo the process of :

(a) decarboxylation (b) hydrolysis
(c) deamination (d) phosphorylation

DU MET-2004
UPCPMT-2002
Rajasthan PMT-1998

Ans. (c) : Before cellular respiration, amino acid undergo the process of deamination.

It involves the removal of amino group from the amino acid, producing ammonia and a keto acid. The ammonia is converted to urea and excreted, while the keto acid can enter metabolic pathway.

30. Which one of the following amino acids is an essential part of human diet?

(a) Glycine (b) Phenylalanine
(c) Serine (d) Aspartic acid

AMU-2007

Ans. (b) : The 9 essential amino acid are histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine. Phenylalanine is an essential part of human diet It occur's naturally in many protein rich foods such as milk, eggs & meat.

It can cause intellectual disabilities, brain damage, seizures and other problem's in people with P.K.U (Phenylketonuria)

B. Structure of Amino acid and its Properties

31. Match the following

List - I	List-II
(A) Serine	**(I) AUG**
(B) Methionine	**(II) GGG**
(C) Lysine	**(III) UCU**
(D) Glycine	**(IV) AAA**

(a) A-II, B-I, C-IV, D-III
(b) A-II, B-IV, C-I, D-III
(c) A-III, B-I, C-IV, D-II
(d) A-III, B-IV, C-I, D-II

TS EAMCET-10.05.2023, Shift-II

Ans. (c) :
The correct match is (c) : A-III, B-I, C-IV, D-II

Amino acid		**Codon**
Serine	–	UCU
Methionine	–	AUG
Lysine	–	AAA
Glycine	–	GGG

32. Match the following

Table-I		Table-II	
A.	AUG	I.	Phenyl alanine
B.	UAA	II	Methionine
C.	UUU	III	Tryptophan
D.	UGG	IV	End codon

(a) A – III, B – II, C – I, D – IV
(b) A – II, B – III, C – IV, D – I
(c) A – II, B – IV, C – I, D – III
(d) A – II, B – IV, C – III, D – I

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : The correct match is (c) : A – II, B – IV, C – I, D – III

A.	AUG (start codon)	II.	Methionine
B.	UAA (signals the end of protein)	IV.	End codon
C.	UUU	I.	Phenyl alanine
D.	UGG	III.	Tryptophan

33. Match the following

List-I		List-II	
A.	Glutamic acid	1.	Aromatic amino acid
B.	Lysine	2.	Neutral amino acid
C.	Valine	3.	Basic amino acid
D.	Tyrosine	4.	Acidic amino acid

(a) A – II, B – I, C – IV, D – III
(b) A – IV, B – III, C – II, D – I
(c) A – IV, B – III, C – I, D – II
(d) A – I, B – IV, C – II, D – III

TS EAMCET 10.05.2023 Shift-I

Ans. (b) :
The correct match is (b) : A – IV, B – III, C – II, D–I

A.	Glutamic acid (–COOH on its side chain)	IV.	Acidic amino acid
B.	Lysine ($–NH_2$)	III.	Basic amino acid
C.	Valine	II.	Neutral amino acid
D.	Tyrosine	I.	Aromatic amino acid

34. Which of the following statements are false regarding the nature of amino acids?

A. The acidity and neutrality of amino acids is based on number of amino and carboxyl groups.
B. Both NH_2 and COOH groups of amino acids show ionizable nature.
C. In solutions of different pH, the structure of amino acids does not change.
D. The amino acids have amino group and aldehyde group as substituents on the same carbon.

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(a) AB (b) CD
(c) BC (d) AD

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : Explanation for false statement–
C. The structure of amino acids can change in solution of different pH due to ionization of the amino and carboxyl groups. At low pH, the amino group (NH_2) is protonated (positively charged), while at high pH, the carboxyl group (COOH) is deprotonated (negatively charged). This affects the overall charge and structure of the amino acid.
D. Amino acids do not have an aldehyde group as a substituent; they have an amino group, a carboxyl group, a hydrogen atom, and an R-group attached to the same carbon.

35. Arrange the following in ascending order
I. Number of stop codons
II. Number of sense codons
III. Number of types of amino acids
IV. Number of types of Nucleosides
(a) III, IV, I, II (b) I, II, IV, III
(c) III, II, I, IV (d) I, IV, III, II

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : The correct order is (d) I, IV, III, II
I. Number of stop codons - 3 (the codan which does not codes for any amino acid)
IV. Number of types of nucleosides - 4
III. Number of types of amino acids - 20
IV. Number of sense codons - 61

36. Given below are two statements :
Statement I : A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal)
Statement II : Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type.)
In the light of the above statement, choose the correct answer from the options given below:
(a) Statement I is false but Statement II is true.
(b) Both Statement I and Statement II are true.
(c) Both Statement I and Statement II are false.
(d) Statement I is true but Statement Ii is false.

NEET (UG) 07.05.2023

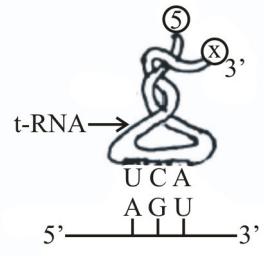
Ans. (a) : A protein is imagined as a line, the left end represented by the first amino acid and the right end represented by the last amino acid. The first amino acid is also called as N-terminal amino acid.
• Adult human haemoglobin are quaternary proteins composed of four protein subunits. However, adult haemoglobin is composed of two α (alpha) and two β (beta) subunits, while fetal hemoglobin is composed of two α (alpha) subunits and two γ (gamma) subunits.
Hence, statement I is false but statement II is true.

37. In the given figure below, what does the 'X' represents ?

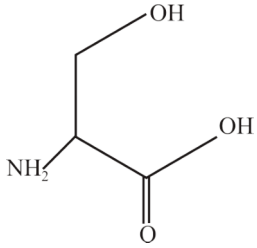
(a) Glycine (Gly) (b) Tyrosine (Tyr)
(c) Valine (Val) (d) Serine (Ser)

GUJCET-2023

Ans. (d) :



Serine is a amino acid. Amino acid are attached to the t-RNA 3'-end as a prerequisite for entering the ribosome for protein synthesis. Amino acid attachment also gives t-RNA access to non ribosomal cellular activities.



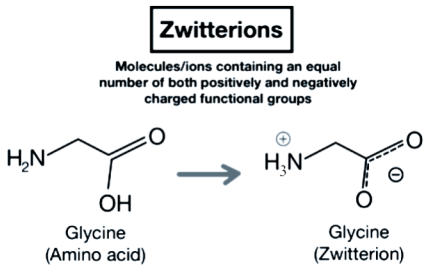
• It is critical for the production of body's proteins, enzymes muscle tissue, membrane & nerve sheet.
It helps also in the production of antibodies.

38. Given below are two statements:
Statement I : Amino acids have a property of ionizable nature of – NH_2 and – COOH groups, hence have different structures at different pH.
Statement II: Amino acids can exist as Zwitterionic form at acidic and basic pH
In the light of the above statements, choose the most appropriate answer from the options given below:
(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

NEET (Re-Exam)-04.09.2022

Ans. (a) : Zwitterion is a compound which has no overall charge, but it contains separate parts which are positively and negatively charged.

@apna_pdf



39. _____**is the primary precursor of Indole-3-acetic acid**

(a) Tryptophan (b) Valine
(c) Tyrosine (d) Phenylalanine

AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Tryptophan is the primary precursor for the production of the plant growth hormone indole- 3-acetic acid or auxin. It is an essential amino acid. The body uses tryptophan to make melatonin and serotonin. Indole-3 acetic acid (IAA, 3-IAA) is the most common, naturally occurring plants hormone.

40. Formula of Glycine

(a) $C_3H_7O_2N$ (b) $C_3H_7O_3N$
(c) $C_{16}H_{32}O_2$ (d) $C_2H_5O_2N$

AP EAPCET-12.07.2022 Shift-I

Ans. (d) : Glycine is an amino acid that has a single hydrogen atom as its side chain. It is used by body to create protein. While our body does naturally produce glycine, it is available through protein rich food.
Formula of Glycine is- $C_2H_5O_2N$.

41. Match the following lists.

List-I	List-II
A. Glycerol	I. Phospholipids
B. Aromatic amino acid	II. Lower melting point
C. Lecithin	III. Trihydroxypropane
D. Gingelly oil	IV. Tryptophan

The correct match is :

	A	B	C	D
(a)	III	IV	I	II
(b)	I	III	IV	II
(c)	II	IV	III	I
(d)	IV	I	II	III

TS EAMCET-09.08.2021 Shift-II

Ans. (a) :

List-I	List-II
A. Glycerol	(iii) Trihydroxypropane
B. Aromatic amino acid	(iv) Tryptophan
C. Lecithin	(i) Phospholipids
D. Gingelly oil	(ii) Lower melting point

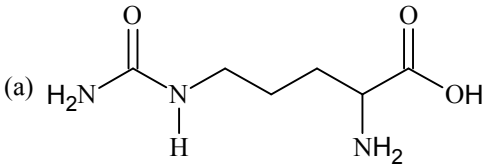
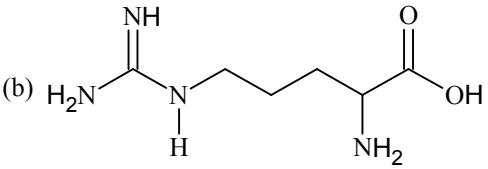
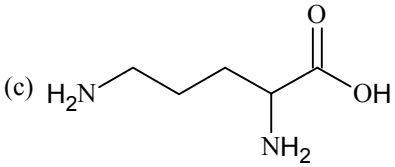
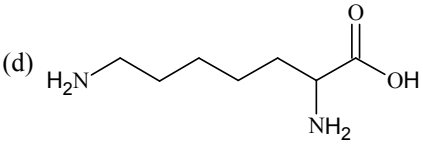
42. Identify the statement which is incorrect.

(a) Tyrosine possesses aromatic ring in its structure
(b) Sulphur is an integral part of cysteine
(c) Glycine is an example of lipids
(d) Lecithin contains phosphorus atom in its structure

NEET-2020 Phase-II

Ans. (c) : Glycine (NH_2 - CH_2 – COOH) is an example of simplest amino acid. It is not a lipid. It is an amino acid. The R group in glycine consists of a hydrogen atom.

43. Citrulline structure

(a) 
(b) 
(c) 
(d) 

JIPMER-2019

Ans. (a) : The organic compound citrulline is an α-amino acid. Its name is derived from **Citrullus**, the Latin word for watermelon.
It has formula -$H_2NC(O)\,NH(CH_2)_3CH(NH_2)CO_2H$.

44. Identify the correct series of biomolecules which do not belong to the given category

- **Homopolymer**
- **Secondary metabolite**
- **Neutral Aminoacid**
- **Aromatic aminoacid**

Options:

(a) Insulin, Rubber, Valine, Tryptophan
(b) Protein, Scent, tyrosine, Tryptophan
(c) Cellulose. Protein, Glutamic acid, Tyrosine
(d) Rubisco, Sugar, Lysine, Valine

AP EAMCET-24.04.2019 Shift-II

Ans. (a) : Homopolymer:- Homopolymer is a type of polymer that is made up of only one type of monomer unit. Ex- Insulin, PVC (Poly Vinyl Chloride), Polythene.

- **Secondary metabolite:-** Secondary metabolites are substances manufactured by plants that make them competitive in their own environment. Ex- rubber, alkaloid etc.
- **Neutral Amino acid:-** Neutral amino acids contain equal number. of amino ($–NH_2$) and carboxyl (–COOH) groups. Ex- Leucine, valine, arginine & Histidine etc.
- **Aromatic amino acid:-** Aromatic amino acid includes an aromatic ring. Ex- phenylalanine, tryptophan and tyrosine.

@apna_pdf

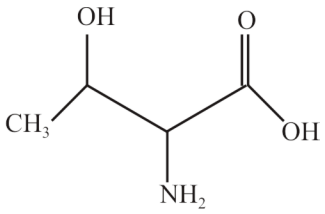
45. Indentify the amino acids containing hydroxy group in their structure

(i) Cysteine **(ii) Threonine**
(iii) Tyrosine **(iv) Glutamic acid**
The correct answer is:

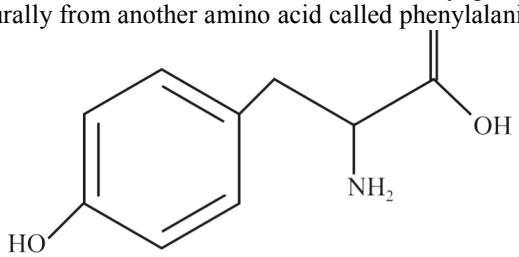
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (ii) and (iv)

TS EAMCET-02.05.2018 Shift-II

Ans. (b) : Threonine is an essential amino acid, is a hydrophilic molecule. It is an hydroxyl - containing amino acid.



Tyrosine is an amino acid which the body produce naturally from another amino acid called phenylalanine.



Tyrosine

46. Among the following, identify the Zwitterionic form

(a) $H_3^+N-\underset{\displaystyle R}{\underset{|}{C}}H-COOH$ (b) $H_3^+N-\underset{\displaystyle R}{\underset{|}{C}}H-COO^-$

(c) $H_3^+N-\underset{\displaystyle R}{\underset{|}{C}}H-CO^+$ (d) $H_2N-\underset{\displaystyle R}{\underset{|}{C}}H-COO^-$

TS EAMCET-02.05.2018 Shift-I

Ans. (b) : A zwitterions is an ion that contains two functional groups. It is an ion possessing both positive and negative electrical charge. The NH_2 group is the stronger base, and so it picks up H^+ from the –COOH group to form a zwitterion.

47. Which of the following is an amino acid derived hormone?

(a) Epinephrine (b) Ecdysone
(c) Estriol (d) Estradiol

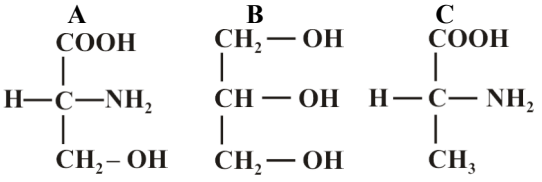
NEET-2018

Ans. (a) : Epinephrine is a tyrosine amino acid derivative hormone it is also known as **catecholamine** secreted by adrenal glands.

Epinephrine also known as **adrenaline**. It plays an in important role in the fight or flight by increasing blood flow to muscles.

- **Estradiol** and **Estriol** are steroid hormones involved in the regulation of estrous and menstrual cycle.
- **Ecdysone** is a steroid hormone that controls moulting in an insects.

48. Identify the names of the structures in the right order



The correct match is

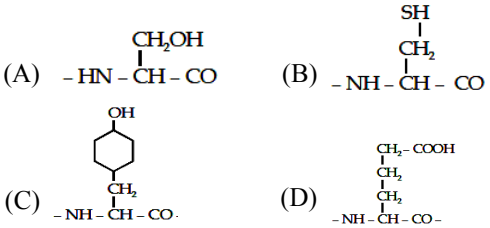
	A	B	C	D
(a)	Serine	Glycerol	Alanine	Fatty acid
(b)	Glycerol	Serine	Fatty acid	Alanine
(c)	Alanine	Fatty acid	Serine	Glycerol
(d)	Fatty acid	Alanine	Glycerol	Serine

TS EAMCET-12.05.2017

Ans. (a) : The specific structure of serine is indicative of its chemical formula, $C_3H_7NO_3$. The R group structure CH_3O, attaches to the central carbon of the amino acid back bone.

- Glycerol has 3 carbon atoms, 8 hydrogen atoms, and 3 oxygen atoms.
- An alanine molecule is composed at a total of three carbon atoms, seven hydrogen atoms, one nitrogen atom and two oxygen atoms.
- Fatty acid consists of a straight chain of an even number of carbon atoms, with hydrogen atoms along the length of the chain and at one end of the chain and a carboxyl group (–COOH) at the other end.

49. The figure shows a hypothetical tetrapeptide portion of a protein with parts labelled A-D. Which one of the following option is correct?

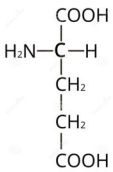


(a) A is the sulphur containing amino acid-methionine
(b) D is the acidic amino acid - glutamic acid
(c) C is an aromatic amino acid - tryptophan
(d) A is the C - terminal amino acid and D is N terminal amino acid

NEET (Karnataka)-2013

Ans. (b) : (D)- Glutamic acid - acidic amino acid.

Glutamic Acid



(A)- Serine (neutral, polar amino acid)
(B)- Cysteine (neutral, polar amino acid)
(C)-Tyrosine (aromatic R groups)

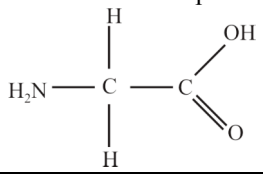
@apna_pdf

50. Which amino acid has no asymmetric carbon atom?

(a) Glycine (b) Alanine
(c) Proline (d) Threonine

Assam CEE-2014

Ans. (a) : Glycine is one of the 20 naturally – occurring amino acids. It's chemical formula is $NH_2 - CH_2 - COOH$. It is an amino acid that has a single hydrogen atom. It is not chiral (asymmetric carbon atom that has four different groups or atoms attached to it). It is a colorless solid having a sweet taste and is highly soluble in water. All amino acids except glycine have an asymmetric carbon which is the alpha- carbon.



51. Which of the following amino acid is metabolised by brain?

(a) Alanine (b) Glutamic acid
(c) Histidine (d) Glycine

BVP-2001

Ans. (b) : Glutamic acid is an amino acid that is used to make proteins. In the body it is converted to glutamate. This is a chemical that helps nerve cells. Send messases to and from other cells in the brain. It may be Inrolved in learning and memory. It is the most abundant excitatory hearotransmitter in vertebrate hervous system. Amiso acids such as teyptophan tyrosine, histidine and arginine are used by the brain for the synthesis of various nutraceuticals and neuromodulators.

52. Which is non-reducing sugar?

(a) Glucose (b) Galactose
(c) Mannose (d) Sucrose

JCECE-2010

Ans. (d) : Sucrose is a non-reducing sugar. A non-reducing sugar is a carbohydrate that does not have a free aldehyde or free ketone functional group in its molecular structure.

53. Initiation of polypeptide chain is through

(a) Methionine (b) Glycine
(c) Lysine (d) Leucine

CMC Vellore-2012

Ans. (a) : Initiation of polypeptide chain is through methionine. In translation, polymerization of amino acids takes place to form a polypeptide. For initiation of polypeptide chain ribosome binds to m-RNA at the start codon that is AUG. AUG is a triplet codon that codes for the amino acid methionine.

54. The reaction, Amino acid + ATP → Aminoacyl AMP + P-P depicts

(a) amino acid assimilation
(b) amino acid transformation
(c) amino acid activation
(d) amino acid translocation

DUMET-2011

Ans. (c) : Amino acid activation is also known as aminoacylation or tRNA charging. It refers to the attachment of an amino acid to its respective transfer RNA (t-RNA). The reaction occurs in the cell cytosol. The amino acid is first activated with ATP to synthesize the aa-AMP intermediate with the release of pyrophosphate.

55. Fish proteins are considered nutritionally superior to most vegetable proteins because they are rich in

(a) all the 20 amino acids
(b) essential amino acids
(c) peptide bonds
(d) polypeptides

AMU-2014

Ans. (b) : Fish proteins are considered nutritionally superior to most vegetable proteins because they are rich in essential amino acids. Animal food called complete protein food because they are the best source where all the essential amino acids are found. In plants, essential amino acids are not found in single vegetable or plants. So, fish protein is nutritionally superior to vegetable proteins. Fish protein is known for containing essential amino acids like tryptophan, cystine, lysine, methionine and threonine.

56. Identify the polypeptide subunits present in the adult human haemoglobin

(a) Two α type subunits and two β type subunits
(b) Four α type subunits
(c) Four β type subunits
(d) Three α type subunits and one β type subunits

AP EAMCET-2015

Ans. (a) : A haemoglobin molecule is made up of four polypeptide chains, two α-chains of 141 amino acid residues each and two β-chains of 146 amino acid residues each.

• There are four heme-iron complexes. Each chain holds a heme group containing one Fe^{++}atom. The heme-iron complexes are colored red because they give hemoglobin its red color.

57. Which of the following statements is wrong?

(a) Sucrose is a disaccharide
(b) Cellulose is a polysaccharide
(c) Glycine is a sulphur containing amino acid
(d) Uracil is a pyrimidine

J&K CET-2003

Ans. (c) : Glycine is a simplest amino acid which has a single hydrogen atom as its side chain. Its chemical formula is $NH_2 - CH_2 - COOH$. It helps in building proteins needed for tissue and hormone maintenance.

58. Which one of the following amino acid was not found to be synthesised in Millers experiment?

(a) Glycine (b) Aspartic acid
(c) Glutamic acid (d) Alanine

JCECE-2014

Ans. (c) : Glutamic acid was not found to be synthesised in Millers experiment. In Miller's experiment amino acids are formed, such as Alanine, Glycine and Aspartic acid.

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59. Identify the sulphur containing amino acid

(a) Proline (b) Methionine
(c) Aspartic acid (d) Tryptophan

WB JEE-2008

Ans. (b) : Methionine and cysteine are the two sulphur containing amino acids in mammals. Methionine is an essential amino acid, obtained by dietary intake while cysteine is non-essential and a metabolite of methionine metabolism. Methionine helps in the initiation of the protein synthesis.

60. Select the aromatic amino acids.

(a) Tyrosine
(b) Valine
(c) Lysine
(d) Tryptophan
(e) Serine

(a) (a) and (d) only (b) (a), (d) and (e) only
(c) (c) and (d) only (d) (b) and (d) only
(e) (a) and (e) only

Kerala PMT-2013

Ans. (a) : Tyrosine, phenylalanine and Tryptophan are the three aromatic amino acid involved in protein synthesis. An amino acid that includes an aromatic ring is called aromatic amino acid to build proteins, all plants and microbes synthesize aromatic amino acids.

C. Lipid and its Function

61. Paraffin wax is

(a) ester (b) acid
(c) monohydric alcohol (d) cholesterol

UP CPMT-2008
BCECE-2010
VMMC-2012
BHU-PMT (Screening)-2006
CGPMT-2008

Ans. (a) : Paraffin wax is an ester. It is obtained from petroleum. It assist in extracting perfumes from flowers, forms a base for medical ointments and supplies a waterproof coating for wood.
It used in candle, wax paper, polishes, cosmetics and electrical insulator.

62. Which of the following is/are essential fatty acids for man ?

(a) Arachidonic acid (b) Linolenic acid
(c) Linoleic acid (d) All of these

Tripura JEE-2018
BHU-PMT (Screening)-2008
VMMC-2004
Punjab MET-2003

Ans. (d) : The two essential fatty acids in the human body are alpha-linolenic acid and linoleic acid. Omega-6 polyunsaturated fatty acid is arachidonic acid. It is found in phospholipids and contributes to membrane formation. The conversion of linoleic acid into arachidonic acid is not an essential amino acid.
Arachidonic acid is a polyunsaturated omega-6 fatty acid. It is present in the phospholipids and helps in the formation of membranes.

63. Assertion (A) : Enzymes are inactivated at low temperature
Reason (R) : Temperature changes the structure of the substrate
The correct option among the following is

(a) (A) and (R) are true, (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : (A) is true but (R) is false.

- Enzymes are inactivated at low temperature. At low temperatures, the number of successful collisions between the enzyme and substrate in reduced because their molecular movement decreases. The reaction is slow.
- Temperature does not change the structure of the substrate.

Hence, c one is the correct answer.

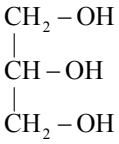
64. Which of the following statements are true regarding lipids?

a) Glycerol is a simple lipid trihydroxy propane.
b) In triglycerides fatty acid is esterified with glycerol.
c) The melting point of oils is higher than that of fats.
d) Saturated fatty acids do not have double bonds

(a) abd (b) abc
(c) acd (d) bcd

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : Among the following statements (a) is true. Glycerol is a simple lipid that is made up of three hydroxyl groups (–OH) bonded to a carbon skeleton. Because of the presence of three hydroxyl groups, it is called trihydroxy. Propane is a three-carbon alkane with the molecular formula C_3H_8. When three hydrogen atoms of propane are replaced by three hydroxyl groups, this gives rise to a molecule of glycerol.



- Statement (b) is also true. In triglycerides, three fatty acids are esterifies to glycerol.
- Statement (c) is false. The melting point of oils is lower than that of fats. Oils are liquid at room temperature, while fats are solid. This is because oils have more double bonds in their fatty acids, which makes them less saturated.
- Statement (d) is true. Saturated fatty acids do not have double bonds. The saturated fatty acids are stable and are short chain fatty acids. When the hydrogen reacts with the unsaturated fatty acid, all the double bonds are converted into the single bonds.

@apna_pdf

65. Following are the statements with reference to 'lipids'

(A) Lipids having only single bonds are called unsaturated fatty acids

(B) Lecithin is a phospholipid.

(C) Trihydroxy propane is glycerol.

(D) Palmitic acid has 20 carbon atoms including carboxyl carbon.

(E) Arachidonic acid has 16 carbon atoms.

Choose the correct answer from the options given below.

(a) (B) and (E) only (b) (A) and (B) only
(c) (C) and (D) only (d) (B) and (C) only

NEET-2021

Ans. (d) : Lecithin is phospholipid, lecithin is a generic term to designate any group of yellow-brownish fatty substances occuring in animal and plant tissues which are amphiphilic, they attract both water and fatty substances and are used for smoothing food textures, emulsifying.

- Glycerol is a simple trihydroxy propane lipid. Glycerol sometimes called **glycerin** is a chemical molecule that is commonly used to treat burns and wounds.

66. Which one of the following is INCORRECT about saturated fatty acids ?

(a) They do not have double bond between carbon atoms.
(b) They are not fully saturated with hydrogen atoms.
(c) Palmitic acid and stearic acid are saturated fatty acids.
(d) They contain maximum possible hydrogen atoms.

MHT CET-06.10.2020 Shift-I

Ans. (b) : When there are only single bonds between the neighboring carbons in the hydrocarbon chain, a fatty acid is said to be saturated. Fatty acid are saturated with the hydrogen. Hence, they are not fully saturated with hydrogen atoms. This statement is incorrect about saturated fatty acid.

67. Concanavalin A is

(a) an essential oil (b) a lectin
(c) a pigment (d) an alkaloid

NEET-2019

Ans. (b): Concanavalin A is lectin. Lectins are proteins with a high degree of stereospecificity to recognize various sugar structures and form reversible linkages upon interaction with glycol-conjugate complexes.

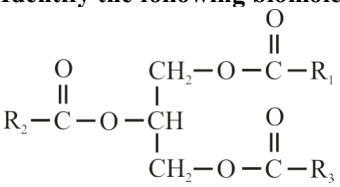
68. Lecithin is a

(a) carbohydrate (b) phospholipid
(c) Nucleoside (d) Protein

NEET (Odisha)-2019
KVPY (SA)-2018

Ans. (b) : Lecithin is a complex mixture of phospholipids found mainly in egg yolk, soya, and coleseeds. The body uses lecithin in the metabolic process and to move fats. It is composed of phosphoric acid, cholines, two fatty acids and esters of glycerol.

69. Identify the following biomolecule :



The above biomolecule is

(a) Triglyceride (b) Glycerol
(c) Phospholipid (d) Cholesterol

TS EAMCET-08.05.2019 Shift-I

Ans. (a) : The above biomolecule is triglycerides. They are esters in which three molecules of one or more different fatty acids are linked to the alcohol glycerol.

70. Which one among the following pairs of nitrogenous bases of nucleic acids, is wrongly matched with the category mentioned against it?

(a) Adenine, Thymine – Purines
(b) Guanine, Adenine – Purines
(c) Uracil, Cytosine – Pyrimidines
(d) Thymine, Uracil – Pyrimidines

JCECE-2018

Ans. (a) : There are 5 types of nitrogenous bases, categorized under purines and pyrimidines. The purine contains bases are Adenine and Guanine while pyrimidine contains Cytosine, Thymine and Uracil. Adenine, Guanine, Cytosine and Thymine are found in DNA while Thymine is replaced by Uracil in RNA.

71. Which of the following are not polymeric?

(a) Nucleic acids (b) Proteins
(c) Polysaccharides (d) Lipids

NEET-2017

Ans. (d) Lipid are not polymer. The basic unit of lipids is a triglyceride, which is synthesized from glycerol (propane-1,2,3- triol) and fatty acids.

72. Which one of the following biomolecules is synthesized in smooth endoplasmic reticulum

(a) Proteins (b) Lipids
(c) Carbohydrates (d) Nucleotides

KVPY (SA)-05.11.2017

Ans. (b) : Lipid molecules in the cell are synthesized by the smooth endoplasmic reticulum. The rough endoplasmic reticulum synthesizes proteins. Golgi apparatus synthesizes complex sugars and plastids are involved in the synthesis of carbohydrates through photosynthesis.

73. Chemically wax is:

(a) A protein (b) A lipid
(c) A carbohydrate (d) An amino acid

VMMC-2003
HP CET-2013
Haryana PMT-2005

Ans. (b) : Chemically wax is a lipid. Waxes are found in nature as coating on leaves and stems. They prevent the plant from losing excessive amount of water

74. Low calorie and low cholesterol is found in

(a) soyabean oil (b) peanut oil
(c) sesame oil (d) sunflower oil

Manipal-2010

@apna_pdf

Ans. (d) : Sun flower oil has low calories and low cholesterol compared to soyabean oil, pea-nut oil, and sesame oil.

75. Most abundant lipid in the cell membrane is:

(a) cholesterol (b) phospholipids
(c) glycolipids (d) cerebrosides

AFMC-2001

Ans. (b) : Most abundant lipid in the cell membrane is phospholipid. These have polar head group and two hydrophobic hydrocarbon tails and head is hydrophilic in nature.

76. What is the substrate for lipase enzyme?

(a) Protein (b) Carbohydrate
(c) Lipid (d) Nucleic acid

WB JEE-2012

Ans. (c) : The substrate for lipase enzyme is lipid. The substrate is the triglyceride which is the building unit of lipids, and the product is the sub-units of the triglyceride which are the glycerol and the fatty acid.

77. Phospholipids are formed by the esterification of

(a) three ethanol molecules with three fatty acid molecules.
(b) one glycerol and two fatty acid molecules.
(c) one glycerol and three fatty acid molecules.
(d) one ethylene glycol and two fatty acids molecules.

KVPY SB & SX-2015

Ans. (b) : Phospholipids are formed by the esterification of one glycerol and two fatty acid molecules. The structure is typically made of a glycerol back bone, 2 fatty acid and tails (hydrophobic) and a phosphate group (hydrophilic).

78. Spoilage of oil can be detected by which fatty acid?

(a) Oleic acid (b) Linolenic acid
(c) Linoleic acid (d) Erucic acid

BHU PMT (Screening)-2010

Ans. (d) : Spoilage of fat oil can be detected by erucic acid. It is a monosaturated omega -9 fatty acid. It is found in more concentrations in oil and easily degraded by micro organisms and produces a foul smell and taste.

79. Hydrolysis of lipid yields :

(a) fats
(b) fatty acids and glycerol
(c) mannose and glycerol
(d) maltose and fatty acid

J&K CET-2006
Rajasthan PMT-2002

Ans. (b) : Hydrolysis of lipid yields is fatty acid and glycerol. Hydrolysis can break down a fat or oil and release the tri-glycerol and fatty acids.

80. Given below is the chemical formula of

$$CH_3(CH_2)_{14}-\overset{\overset{O}{\|}}{C}-OH$$

(a) palmitic acid (b) glycerol
(c) galactose (d) stearic acid

JIPMER-2014

Ans. (a) : The given chemical formula is of palmitic acid. It is the most common saturated fatty acid found in animals, plant and microorganisms. Its chemical formula is $CH_3(CH_2)_{14}$ COOH and is represented as :

$$CH_3(CH_2)_{14}-\overset{\overset{O}{\|}}{C}-OH$$

81. Phospholipids are

(a) amphipathic (b) amphibolic
(c) hydrophobic (d) none of these

JIPMER-2004

Ans. (a) : Phospholipids are amphipathic carrying both hydrophilic polar and Hydrophobic non polar groups.

- The hydrocarbon chains of the two fatty acids function as form hydrophobic non polar tails of the phospholipids molecules. The phosphate and additional group (nitrogenous or non nitrogenous) behave as hydrophilic polar group of the molecule.

82. Lipids are insoluble in water because lipid molecules are : -

(a) Hydrophilic (b) Hydrophobic
(c) Neutral (d) Zwitter ions

AIPMT-2002

Ans. (b) : Lipids are organic compounds which are non polar molecules. They are soluble only in non polar solvents and insoluble in polar solvents like water.
Lipid lack charged groups, the water molecules have nothing to stick and don't mix with them.

83. A phosphoglyceride is always made up of :

(a) a saturated or unsaturated fatty acid is esterified to a phosphate group which is also attached to a glycerol molecule
(b) only saturated fatty acid is esterified to a glycerol molecule to which a phosphate group is also attached
(c) only a unsaturated fatty acid is esterified to a glycerol molecule to which a phosphate group is also attached
(d) a saturated or unsaturated fatty acid is esterified to a glycerol molecule to which a phosphate group is also attached

NEET-2013

Ans. (d) : Phosphoglyceride is made of a saturated or unsaturated fatty acid esterified to a glycerol molecule. They are also called as glycerophospholipids.
Biological membranes usually involve two layers of phospholipids with their tails pointing inward, this arrangement is called a phospholipid bilayer.

84. One of the following substances is at its lowest level in fish food:

(a) actin (b) myosin
(c) cholesterol (d) tissue fluid

AP EAMCET-1998

Ans. (c) : Cholesterol is present in very low level in the fish food. It is a sterol that is found in very small amounts in fish flesh.

85. Hydrolysis of lipid yields:

(a) fatty acids and maltose
(b) fatty acids and glycerol
(c) mannose and glycerol

@apna_pdf

(d) maltose and fatty acid

Rajasthan PMT-2002
JCECE-2003

Ans. (b) : Hydrolysis of lipid can break down a fat or oil and release the triglyceral and fatty acids. An enzyme called lipase catalyses the hydrolysis of the fats and oils. It also known as **lipolysis**.

$$\text{Fats} + H_2O \xrightarrow{\text{lipase}} \text{Glycerol} + \text{Fatty acids}$$

86. Chemically wax is :
(a) a protein (b) a lipid
(c) a carbohydrate (d) an amino acid

BCECE-2015
Haryana PMT-2001

Ans. (b) : Naturally waxes are present as coating on leaves and stems and prevents the plant from losing excessive amount of water. It is a simple lipid which is an ester of a long-chain alcohol and a fatty acid. Alcohol may contain from 12-32 carbon atoms.

87. Paraffin wax is :
(a) ester (b) acid
(c) monohydric alcohol (d) cholesterol

BCECE-2010
CG PMT-2008
BHU PMT (Screening)-2006

Ans. (a) : Paraffin wax is classified as a petroleum wax. It comes from petroleum, coal and oil shale. The esters of long-chain (about 14-C to 36-C atoms) saturated and unsaturated fatty acids with long-chain alcohols (16-C to 30-C atoms) are known as waxes. It means, chemically the waxes are esters

88. In DNA molecule, the number of hydrogen bonds between adenine and thymine are:
(a) two (b) three
(c) four (d) eight

AP EAMCET-1997

Ans. (a) : In DNA molecule, Adnenine (A) and Thymine (T) together form a double hydrogen bond $(A = T)$ while Cytosine and Guanine form a triple Hydrogen Bond $(C \equiv G)$. Hydrogen bonds are formed between complementary nitrogenous bases on the interior of DNA.

89. The enzyme which acts to hydrolyse or breakdown a polynucleotide chain into its component nucleotide is
(a) Gyrases (b) Polymerases
(c) Nucleases (d) Primases

CG PMT-2010

Ans. (c) : The enzyme which act to hydrolyse or breakdown a polynucleotide chain into its components nucleotides is nuclease. DNA nuclease catalyze the cleavage of phosphodiester bonds. These enzymes play crucial roles in various DNA repair processes which involve DNA replication, base excision repair nucleotide excision repair, mismatch repair and double strand break repair.

90. Which base is present in RNA but not in DNA?
(a) Uracil (b) Thymine
(c) Guanine (d) Cytosine

BCECE-2004

Ans. (a) : Uracil is present in RNA but not in DNA Uracil is one of the four nucleobases in the nucleic acid RNA. The others are adenine, cytosine and guanine. In RNA, uracil binds to adenine via two hydrogen bonds. In DNA, the uracil nucleobases is replaced by thymine. Uracil is a demethylated form of thymine.
Formula:- $C_4H_4N_2O_2$

91. What base is responsible for hot spots in spontaneous point mutation?
(a) Adenine (b) Guanine
(c) 5-bromouracil (d) 5-methylcytocine

AMU-2002

Ans. (c) : Spontaneous point mutations are mutations that occurs naturally in DNA without any external influence. They can be caused by errors in DNA replication, deamination or depurination.
5- bromouracil is a base that is structurally similar to thymine. It can be incorporated into DNA in place of thymine during DNA replication.

92. Purines possess nitrogen at
(a) 1, 2, 4 and 6 position
(b) 1, 3, 5 and 7 position
(c) 1, 3, 7 and 9 position
(d) 1, 2, 6 and 8 position

WB JEE-2010

Ans. (c) : Purines posses nitrogen at 1,3,7 and 9. Nitrogen bases present in DNA can be grouped into two categories Purines (Adenine [A] Guanine [G]) and Pyrimidine (Cytosine [C] and thymine [T].) These nitrogenous bases are attached to C1 of deoxyribose through a glycosidic bond.

93. A nucleoside is :
(a) base + sugar
(b) base + phosphate
(c) sugar + phosphate
(d) base + sugar + phosphate

Punjab MET-2003

Ans. (a) : A nucleoside consist of a base and sugar.
A Nitrogenous base is a nitrogen containing compound that may form a nucleoside when they are attached to five carbon sugar ribose or deoxyribose.

94. The number of hydrogen bonds present between guanine and cytosine are:
(a) 2 (b) 3
(c) 4 (d) 5

BVP-2014
Rajasthan PMT-1996

Ans. (b) : The number of hydrogen bonds present between guanine and cytosine are three that is $(G \equiv C)$.

95. A nucleoside differs from a nucleotide in not having
(a) sugar (b) glucose
(c) nitrogen base (d) phosphate group

DUMET-2010

Ans. (d) : A nucleoside differs from a nucleotide in not having phosphate group. The main difference is in between their molecular composition as nucleosides contain sugar and a base where as nucleotides contain sugar, base and a phosphate group as well.

@apna_pdf

96. RNA and DNA are similar in

(a) having similar sugars
(b) having similar pyrimidine bases
(c) being capable to replicate
(d) being polymers of nucleotides

AFMC-2007

Ans. (d) : RNA and DNA are similar in being polymers of nucleotides. The other similarities are that both DNA and RNA store genetic information consist of sugar, nitrogenous bases and phosphate.

D. Nitrogenous Base

97. Which purine base is found in RNA?

(a) Thymine (b) Uracil
(c) Cytosine (d) Guanine

CGPMT-2004
MANIPAL-2001
AIPMT-1996
Rajasthan PMT-1995

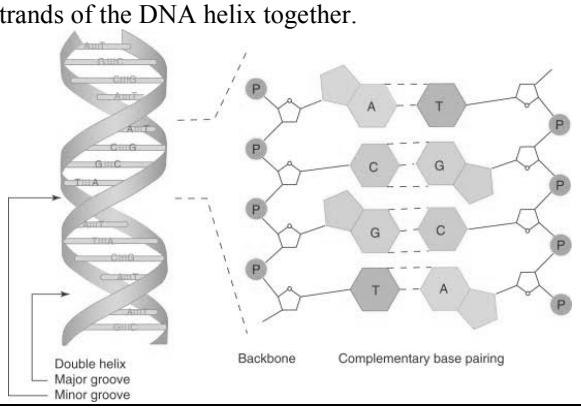
Ans. (d) : Purines are derived from their parent compound purine, which contains a 6-membered pyrimidine ring fused to the 5-membered imidazole ring and is related to uric acid. The 2 purine derivatives are- Adenine and Guanine. These are found in both DNA and RNA

98. The bonds found in a polynucleotide chain between the individual nucleotides and nitrogen bases

(a) Peptide bond, Hydrogen bond
(b) Hydrogen bond, Peptide bond
(c) Phosphodiester bond, Hydrogen bonds
(d) Glycosidic bond, Phosphodiester bond

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : The bonds found in a polynucleotide chain between the individual nucleotides and nitrogen bases are phosphodiester bond and hydrogen bonds. Phosphodiester bonds are covalent bonds that are formed between the phosphate group of one nucleotide and the hydroxyl group of the sugar of the next nucleotide in a linear chain while hydrogen bonds forms between nitrogenous bases of the nucleotides. These bonds are weak bonds. Hydrogen bonds hold the two strands of the DNA helix together.



99. Match List - I with List - II:

List-I		List-II	
A.	Adenine	1.	Pigment
B.	Anthocyanin	2.	Polysaccharide
C.	Chitin	3.	Alkaloid
D.	Codeine	4.	Purine

Choose the correct answer from the options given below:

(a) (A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)
(b) (A) - (iv), (B) - (iii), (C) - (ii), (D) - (i)
(c) (A) - (iii), (B) - (i), (C) - (iv), (D) - (ii)
(d) (A) - (i), (B) - (iv), (C) - (iii), (D) - (ii)

NEET (Re-Exam)-04.09.2022

Ans. (a) :

A.	Adenine	4.	Purine
B.	Anthocyanin	1.	Pigment
C.	Chitin	2.	Polysaccharide
D.	Codeine	3.	Alkaloid

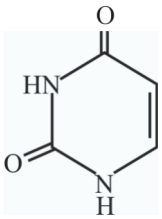
100. The bonds between Guanine and Cytosine

(a) Single H bond (b) 3-H bonds
(c) Double H bonds (d) Tetra H bonds

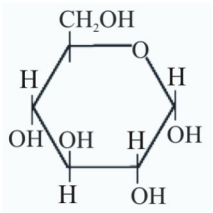
SRM JEEE-2018
AP EAMCET-11.07.2022 Shift-II

Ans. (b) : Guanine and cytosine are bonded with three H–bond (C ≡ G), while adenine and thymine make two H–bond (A = T) between them.

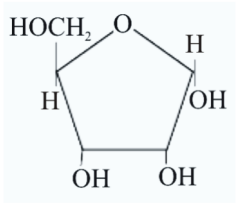
101. Select the option having correct matching of structure and sequence of the molecules given below –



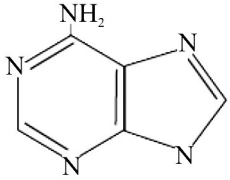
A



B



C



D

(a) A – Uracil, B – Glucose, C – Ribose, D - Adenine
(b) A – Adenine, B – Glucose, C – Uracil, D - Ribose
(c) A – Uracil , B –Ribose, C – Glucose, D – Adenine
(d) A – Adenine, B – Uracil, C – Ribose, D – Glucose

AIIMS-27.05.2018 Shift-I

@apna_pdf

Ans. (a) : Nucleic acids and DNA in particular are key macromolecules for the continuity of life. DNA bears the hereditary information that's passed on from parents to children.

Uracil is one of the four nucleobases in the nucleic acid RNA. The others are Adenine, Cytosine, and Guanine. In RNA, Uracil binds to adenine via two hydrogen bonds. In DNA, the Uracil is replaced by Thymine.

Glucose is the group of carbohydrates which is a simple sugar with a chemical formula $C_6H_{12}O_6$.

Ribose is a simple sugar and carbohydrates with molecular formula $C_5H_{10}O_5$.

102. Suppose, evolution on earth had occurred in such a way that there are 96 amino acids instead of 20. DNA has 12 different types of bases and DNA synthesis occurs in the same way as today. The minimum number of bases per DNA codon would be

(a) 12 (b) 8
(c) 2 (d) 3

AIIMS-2017

Ans. (c) : If one base codes for single amino acid, the total amino acids will be 12 as (12^1) is equal to 12. But we have 96 amino acid. Similarly, if two bases code for one amino acid, the total amino acids will have 144 as (12^2) is equal to 144. Thus, 2 bases can be used to code 96 amino acids or 20 amino acids Hence, the minimum number of bases per DNA codon should be 2.

103. Which of the following is not a pyrimidine?

(a) Thymine (b) Uracil
(c) Guanine (d) Cytosine

JIPMER-2008

Ans. (c) : Purines and pyrimidines make up the two groups of nitrogenous bases, including the two groups of nucleotide bases. So, Guanine is not a pyrimidine derivative. Two major purines present in nucleotides are adenine (A) and guanine (G), and three major pyrimidines are thymine (T), cytosine (c), and uracil (U).

104. DNA and RNA are different molecules as:

(a) DNA has cytosine and RNA has guanine
(b) DNA has uracil and RNA has thiamine
(c) DNA is a macromolecule and RNA is a macromolecule
(d) DNA has thymine and RNA has uracil

J&K CET-2002

Ans. (d) : DNA and RNA are different molecules as DNA has thymine and RNA has uracil. DNA differs from RNA in the nature of sugar & Pyrimidines. DNA has deoxyribose sugar, while RNA has ribose sugar. Among Pyrimidines, DNA has thymine and cytosine, while RNA has uracil and cytosine.DNA Replicates and stores genetic information & RNA carry out instructions encoded in DNA.

105. Which of the following is nucleoside?

(a) Adenosine (b) Adenine
(c) Deoxyribose (d) Adenylic acid

Assam CEE-2014

Ans. (a) : Nucleosides are made of a nitrogenous base, usually either a purine or pyrimide, and a five-carbon carbohydrate ribose or deoxyribose.
Nucleoside = Nitrogen base + Pentose sugar

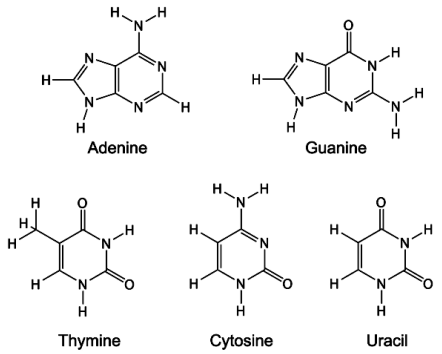
106. Which statement is true?

(a) Adenine has 4 nitrogen atoms
(b) Cytosine has 3 nitrogen atoms
(c) Guanosine has 3 nitrogen atoms
(d) Uracil has 5 nitrogen atoms

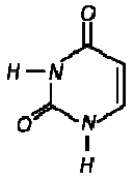
AIIMS-2007

Ans. (b) : Purines and Pyrimidines - Adenine (A) and Guanine (G) are purines.
Cytosine (C), Thymine (T) and Uracil (U) are pyrimidines.

- Cytosine is a pyrimidine nucleobase with a chemical formula of $C_4H_5N_3O$. Nitrogeneous base cytosine has three nitrogen atom.



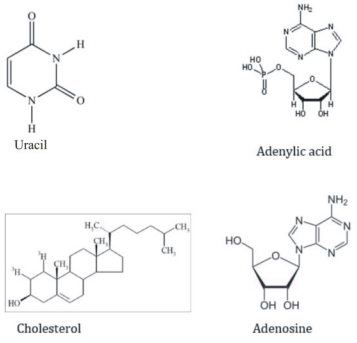
107. Identify the given structure.



(a) Adenylic acid (b) Uracil
(c) Cholesterol (d) Adenosine

AIIMS-2016

Ans. (b) The demethylated form of thymine is uracil. It is a primary nitrogenous base of RNA which pairs with the adenine by forming two H-bonds. It is replaced by thymine in DNA.
The image given below gives the structure of uracil, adenylic acid, cholesterol and adenosine.



108. Which of the following nucleotide sequences contains 4 pyrimidine bases?

(a) GATCAATGC (b) GCUAGACAA
(c) UAGCGGUAA (d) Both (b) and (c)

AIPMT-1994

@apna_pdf

Ans. (a) : Pyrimidine Bases are the nitrogenous bases, which have single heterocyclic ring. These are all derived from their parent heterocyclic compound pyrimidine As- Uracil, Thymine & Cytosine.
In, GATCAATGC = 4 pyrimide bases are present.

109. Which of the following is correct pair of pyrimidime bases ?
(a) Adenine and Thymine
(b) Adenine and Guanine
(c) Thymine and Cytosine
(d) Guanine and Cytosine

MHT CET-2015

Ans. (c) : Cytosine and thymine are examples of pyrimidine which is composed of a single ring 6 atom structure.

110. Which of the following is absent in DNA?
(a) U (b) A
(c) T (d) G

DUMET-2003

Ans. (a) : The nitrogenous bases present in DNA are- Adenine, Guanine, Cytosine and Thymine, while in RNA, Uracil is present in place of Thymine. In DNA molecule Uracil is absent.

111. Adenine is :
(a) pyrimidine base (b) purine base
(c) five carbon ring (d) structure with ring

Rajasthan PMT-1999
AIPMT-1992

Ans. (b) : Adenine is derived from purine, which contains of a 6- membered pyrimidine ring fused to the 5-membered imidazole ring & is related to uric acid. It is a white crystalline purine base, found in both DNA & RNA.

112. The nitrogen base found only in DNA is also called
(a) 5-methyl uracil (b) NH_4Cl
(c) Uracil (d) Guanine

Karnataka CET-2015

Ans. (a) : The nitrogen base found only in DNA is called Thymine or 5-methyl uracil or 5-methyl 2,4 dioxy pyrimidine.

113. During prolonged fasting, in what sequence are the following organic compounds used up by the body?
(a) First carbohydrates, next proteins and lastly lipids
(b) First proteins, next lipids and lastly carbohydrates
(c) First carbohydrates, next fats and lastly proteins
(d) First fats, next carbohydrates and lastly proteins

MGIMS Wardha-2010

Ans. (c) : During prolonged fasting first carbohydrates, next fats and lastly proteins moleculs are used up by the body. In addition prolonged fasting leads to an increase in the concentration of growth hormone glucagon and a decrease in the blood levels of thyrotropin and T_3/T_4

114. Houskeeping proteins are found in
(a) endoplasmic reticulum (b) cytoskeleton
(c) Golgi complex (d) All of the above

Manipal-2015

Ans. (d) : Houskeeping proteins are found in endoplasmic reticulum, cytoskeleton and Golgi complex. They are defined as proteins which are required for the basis function of a cell .
For example-enzymes involved in the synthesis and processing of DNA, RNA, proteins or the major metabolic pathways, These kinds of proteins are found in all cells and in various organelles of the cell. so the correct option is D.

115. Which statement is correct for biomolecules?
(a) DNA is a polymer of ribonucleotides
(b) All carbohydrates break into glucose
(c) Sequence of amino acids determine primary structure of protein
(d) RNA is single - stranded and contains different urine bases other than DNA

VMMC-2011

Ans. (c) : Sequence of amino acids determine primary structure of protein. Each amino acid is linked to next amino acid through peptide bonds created during the protein biosynthesis process.

116. Which one of the following peak absorption range of ultraviolet light by heterocyclic bases (nitrogen bases)
(a) 26 nm (b) 1500 nm
(c) 75 nm (d) 260 nm

Rajasthan PMT-2000

Ans. (d) : The heterocyclic bases of DNA or RNA absorb ultraviolet light a wavelength of 260 nanometer. This is because the alternating single and double bonds in the ring create a system of molecular orbitals that can absorb ultraviolet light at this wavelength.

117. Nitrogenous bases present in DNA
(a) adenine, guanine, cytosine, thymine
(b) adenine, guanine, cytosine, uracil
(c) adenine, thymine, uracil
(d) guanine, uracil

AFMC-2010

Ans. (a) : Nitrogenous base present in DNA are Adenine, Guanine, Cytosine and Thymine. Nitrogenous bases also called Nucleobases, are nitrogenous compounds that form an important part of the nucleotides, Nucleotides are building blocks of DNA and RNA that are composed of a sugar, nitrogenous base and a phosphate group.

E. Primary and Secondary Metabolites

118. The mineral elements required for carbohydrate translocation, photoysis of water and for chlorophyll synthesis are respectively
(a) Boron, Manganese, Zinc
(b) Boron, chlorine, Iron
(c) Molybdenum, copper, Magnesium
(d) Molybdenum, Copper, Iron

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : • Carbohydrate translocation– Boron (B) is the mineral element required for carbohydrate (sugar) translocation in plants.

@apna_pdf

- **Photolysis of Water–** Manganese (Mn) is essential for the process of photolysis of water during photosynthesis. Manganese and calcium are present in the core of the OEC, which is essential for photolysis of water.
- **Chlorophyll Synthesis–** Iron and magnesium (Mg) is necessary for the synthesis of chlorophyll, the green pigment used in photosynthesis.

119. Find out the correct match

Set-I		Set-II	
A.	Carbohydrates	i.	Nucleosides, Phosphates
B.	Proteins	ii.	Glucose, Fructose, Galactose
C.	Fats	iii.	Amino acids
D.	Nucleic acids	iv.	Fatty acids, glycerols

(a) A – i, B – iii, C – iv, D – ii
(b) A – ii, B – iii, C – i, D – iv
(c) A – ii, B – iii, C – iv, D – i
(d) A – ii, B – iv, C – iii, D – i

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : The correct match is (c) : A – ii, B – iii, C – iv, D – i

A.	Carbohydrates	ii.	Glucose, Fructose, Galactose
B.	Proteins	iii.	Amino acids
C.	Fats	iv.	Fatty acids, glycerols
D.	Nucleic acids	i.	Nucleosides, Phosphates

120. Which of the following are not secondary metabolites in plants?

(a) Rubber, gums
(b) Morphine, codeine
(c) Amino acids, glucose
(d) Vinblastin, curcumin

NEET-2021

Ans. (c) : Amino acids and glucose are included under the category of **primary metabolites**.

- They have identifiable functions and play known roles in normal physiological processes**.**
- Rubber, gum, morphine, codeine, vinblastin and curcumin are included under the category of secondary metabolites as their role or functions in host organisms is not known yet.

121. Match the following

A.	**Aquaporin**	**i**	**Amide**
B.	**Asparagine**	**ii**	**Polysaccharide**
C.	**Abscisic acid**	**iii**	**Polypeptide**
D.	**Chitin**	**iv**	**Carotenoids**

Select the correct option

(a) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)
(b) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)
(c) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(d) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)

NEET-2020 Phase-II

Ans. (b) :

(A)	Aquaporin	(iii)	Polypeptide
(B)	Asparagine	(i)	Amide
(C)	Abscisic acid	(iv)	Carotenoids
(D)	Chitin	(ii)	Polysaccharide

122. Match the following

(A)	**Inhibitor of catalytic activity**	**(i)**	**Ricin**
(B)	**Possess peptide bonds**	**(ii)**	**Malonate**
(C)	**Cell wall material**	**(iii)**	**Chitin**
(D)	**Secondary metabolite**	**(iv)**	**Collagen**

Choose the correct option from the following

	(A)	**(B)**	**(C)**	**(D)**
(a)	(iii)	(i)	(iv)	(ii)
(b)	(iii)	(iv)	(i)	(ii)
(c)	(ii)	(iii)	(i)	(iv)
(d)	(ii)	(iv)	(iii)	(i)

NEET-2020 Phase-I

Ans. (d) :
(A) Inhibitor of Catalytic activity (ii) Malonate
(B) Possess peptide bonds (iv) Collagen
(C) Cell wall material in fungi (iii) Chitin
(D) Secondary metabolite (i) Ricin.

123. Glucose on reacting with Benedict solution may give the following precipitates except

(a) Violet precipitate
(b) Orange red precipitate
(c) Brick red precipitate
(d) Green/yellow precipitate

AIIMS-26.05.2019 Shift-I

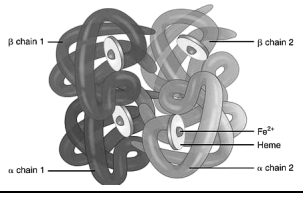
Ans. (a) : Glucose give different precipitation on reacting with Benedict solution like orange red precipitate, Brick red precipitate and Green/ yellow precipitate but does not give a violet precipitate. Benedict's solution is a reagent used to test for reducing sugar.
Benedict solution is a complex mixture of sodium carbonate, sodium citrate and copper (ii) sulfate pentahydrate.
Benedict's solution to test for simple carbohydrates like glucose. Benedict's solution is blue but, if simple carbohydrates are present, it will change color – green/yellow to brick red color.

124. How many polypeptide chains are there in 1 Hb molecule?

(a) 2 α & 2 β (b) 4 α
(c) 4 β (d) 1 α & 3 β

AIIMS-26.05.2018 Shift-I

Ans. (a) : In one molecule of haemoglobin chain there are total four polypeptide chains including two alpha (α) chains with 141 amino acid residues and two beta (β) chains with 146 amino acid residues.



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125. Which ONE of the following molecules is a secondary metabolite?

(a) Ethanol (b) Lactate
(c) Penicillin (d) Citric Acid

KVPY (SA)-2018

Ans. (c) : Penicillin is secondary metabolites. Secondary metabolites are the natural organic products of low molecular mass produced by bacteria, fungi, animals or plants which are not directly involved in the normal growth, development or reproduction of the organism. Their production is influenced by environmental factors and production is regulated by complex – biochemical pathways.

126. Which one of the following is the correct matching of a vitamin, its nature and its deficiency disease?

(a) Vitamin-A-Fat soluble-Night blindness
(b) Vitamin K-Fat soluble -beri-beri
(c) Vitamin-A-Fat soluble-beri-beri
(d) Vitamin-K-Water soluble-Pellagra

AIIMS-2017

Ans. (a) : Fat-soluble vitamins are A, D, E, and K. The deficiency of vitamin A can cause **night blindness**.

- **Vitamin A** acts as regulator of cell and tissue growth and differentiation. vitamin-D provides a hormone like function, regulating mineral metabolism for bones and other organ.
- **Beri-Beri** disease is caused by due to deficiency of vitamin-B.
- **Pellagra** disease caused by vitamin-B_3.

127. Match the biological molecule listed under column-I with their biological function listed under column-II. Choose the answer which gives correct combination of alphabets or the two columns.

column-I (Biological Molecule)		column-II (Function)	
A.	Glycogen	1.	Hormone
B.	Globulin	2.	Biocatalyst
C.	Steroid	3.	Antibody
D.	Thrombin	4.	Storage product

	A	B	C	D
(a)	3	2	4	1
(b)	4	2	1	3
(c)	2	4	3	1
(d)	4	3	1	2

JIPMER-2015

Ans. (d) :

Biological Molecule		Function
Glycogen	-	Storage Product
Globulin	-	Antibody
Steroid	-	Hormone
Thrombin	-	Biocatalyst

128. Which of the following secondary metabolites belong to the group drugs?

(i) Morphine (ii) Curcumin
(iii) Codeine (iv) Vinblastine
(v) Abrin

(a) i and ii only (b) i and v only
(c) ii and iii only (d) ii and iv only
(e) iii and iv only

Kerala PMT-2015

Ans. (d) : Curcumin and vinblastine secondary metabolites belong to the group drugs.
Vinblastine is used as an anticancer drug. It is the salt of an alkaloid extracted from of flowering herb commonly known as periwinkle.
Curcumine is a component of turmeric and also used as a drug. It is produced by plalnts of *Curcuma longa* species. It can help in oxidative, inflammatory conditions, metabolic syndrome, arthritis etc.

129. Three crops that contribute maximum to global food grain production are –

(a) Wheat, rice and maize
(b) Rice, maize and sorghum
(c) Wheat maize and sorghum
(d) Wheat, rice and barley

AIPMT-2005

Ans. (a) : Wheat, rice and maize contribute maximum to global food grain production. They are a rich source of carbohydrate, present in endosperm, which is edible portion in cereals.

- Rice alone is the staple food of 60% of world population more than 50% Indians.
- Wheat is world's most widely cultivated crop. Maize is an important Kharif crop of India and also contributed to food production.

130. Vitamin B_6 is also called

(a) Thiamine (b) Pantothenic acid
(c) Pyridoxine (d) Retinol

AIIMS-2010

Ans. (c) : Vitamin B_6 is also called as **pyridoxine**. B_6 helps to produce calming neurotransmitters, including serotonin and GABA. It is involved in the process of making serotonin and non-epinephrine which are chemicals that transmit signals in the brain.

- Vitamin B_6 is also involved in the formation of myelin, a protein layer that forms around nerve cells.
- Vitamin B_6 might help reduce symptoms of depression.
- B_6 deficiency causes problem in nerves, skin, mucous membranes and circulatory system.

131. Which of the following sugars is not found in plants?

(a) Sucrose (b) Glucose
(c) Lactose (d) Fructose

AIIMS-2009

Ans. (c) : Except lactose, all fructose, sucrose and glucose are found in plants. Lactose is a disaccharide made up of glucose and galactose. It is also known as **milk sugar**. It is found the cow milk, buffalo milk and human (female) milk

132. From the following groups, select the one which has only secondary metabolites?

(a) Arbrin, cellulose, arginine, tyrosine
(b) Glycine, gums, serine, diterpenes
(c) Carotenoids, phenylalanine, curcumin, rubber
(d) Concanavalin–A,morphine,codeine,vinblastin

AIIMS-2013

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Ans. (d) : Concanavalin- A, morphine, codeine, vinblastine are secondary metabolites. The secondary metabolites are the derivatives of the primary metabolites and they do not have any direct function in growth and development of plants.

133. Select the option having all correctly matched pairs.

A. Alkaloids	**(i) Carotenoid; Anthocyanin**
B. Pigments	**(ii)Vinblastin; curcumin**
C. Drugs	**(iii)Morphine; Codeine**

(a) A-i; B-ii; C-iii (b)A-ii;B-iii; C-i
(c) A-iii; B-i, C-ii (d)A-i; B-iii; C-ii

AIIMS-2012

Ans. (c) :

(A) Alkaloids	(iii) Morphine, Codeine
(B) Pigments	(i) Carotenoid, Anthocyanin
(C) Drugs	(ii) Vinblastin, Curcumin

134. Which of the following would not give Fehling's test?

(a) Glucose (b) Sucrose
(c) Fructose (d) Lactose.

AIIMS-2002

Ans. (b) : Fehling's test is given only by reducing sugars. When Fehling's solution is added to any reducing sugar then a red precipitate is formed which shows that reduction has taken place. Sucrose does not give this test. Presence of aldehyde but not ketones is detected by this test. The test will turn out to be positive only when a free aldehyde group is present . The Fehling's test does not detect presence of sugar, it can only detect sugar having aldehyde group.

135. Which of the following vitamins is essential for DNA synthesis and cell division?

(a) Vitamin - A (b) Vitamin - D
(c) Folic acid (d) Vitamin - K

CG PMT-2005

Ans. (c) : Folic acid is also known as **vitamin B9**. It is an essential nutrient necessary for protein and nucleic acid (DNA & RNA) synthesis. It is an important part of cell division and in making cells in some organs and bone marrow.

136. Antifeedant property occurs in

(a) nicotine (b) azadirachtin
(c) rotenone (d) cinerin

WB JEE-2007

Ans. (b) : It is a naturally occuring substance in certain plants which adversely affects insects or other animals which eat them. Azadirachtin has been shown to be and antifeedant and disrupt insect growth by blocking the release of the morphogenic peptide harmone. It is an extract of fruit from the neem tree *(Azadirachta indica),* which is largely grown in India.

137. Which of the following cannot be isolated from plants ?

(a) Riboflavin (b) Niacin
(c) Vitamin B_{12} (d) Vitamin C

DUMET-2002

Ans. (c) : Vitamin B_{12} commonly known as cyanocobalamin is exclusively generated commercially through fermentation in presence of *Pseudomonas denitrificans* and *Propionibacterium freudenreichii.* Vitamin B_{12} is the only vitamin that cannot be isolated by plant. It is a water soluble vitamin and they contain cobalt element and play role in the production of red blood cell and the function of the nervous system.

138. Which of the following metal is present in vitamin B_{12}?

(a) Cobalt (b) Copper
(c) Zinc (d) Magnesium

DUMET-2005

Ans. (a) : Cobalt metal is present in vitamin B_{12} so, it is called as **cobalamine.** This makes it the largest and most complex vitamin of all. Cobalt in ruminants, is an essential component for the microbial synthesis of vitamin B_{12}.

139. Maltose gives rise to two molecules of

(a) fructose (b) lactose
(c) glucose (d) sucrose

DUMET-2011

Ans. (c) : Maltose gives rise to two molecules of glucose. When maltose is hydrolysed, the glycosidic bond between the two glucose molecules breaks and maltose is converted in to 2 glucose molecules in the presence of maltase enzyme.

$C_{12}H_{22}O_{11} + H_2O \xrightarrow{\text{Maltase}}$ Glucose + Glucose ($2C_6H_{12}O_6$) (maltose)

140. Which of the following vitamins has some physiological effects similar to those of parathormone?

(a) Vitamin - A (b) Vitamin - D
(c) Vitamin - C (d) Vitamin - B

DUMET-2011

Ans. (b) : Vitamin D has same physiological effect similar to parathormone. Parathyroid hormone increases the activity of the enzyme that produces active vitamin D. This increase in the concentration of calcium together with vitamin-D feeds back to the parathyroid glands to stop further parathyroid hormone release.

141. Which one of the following is antioxidant vitamin?

(a) C, E, A (b) B_1, B_4
(c) A, D, E (d) B_3, B_5

DUMET-2003

Ans. (a) : Antioxidants are found in certain foods and may prevent some of the damage caused by free radicals by neutralising them. These include the nutrient antioxidants, vitamin A, C, E, and the minerals copper, zinc and selenium. They are found in colourful fruits and vegetables, especially those with purple, blue, red, orange and yellow hues.

142. Linoleic acid is an unsaturated fatty acid and its content is highest in

(a) coconut oil (b) sunflower oil
(c) groundnut oil (d) cotton oil

J&K CET-2013

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Ans. (b) : Linoleic acid is an unsaturated fatty acid derived from hydrolyzed botanical oils, such as sunflower, and is a major component of biological cell membranes. Sun flower oil has 70% linoleic acid, 20% oleic acid and 10% saturated fats.

143. A typical disacchride, maltose is composed of
(a) β-glucose and β-galactose
(b) α-glucose and α-fructose
(c) α-sucrose and β-glucose
(d) two units of similar glucose

Manipal-2014

Ans. (d) : Maltose is composed of two molecules of glucose in an α- (1,4) glycosidic linkage. Maltose (or malt sugar) is an intermediate in the intestinal digestion of glycogen & starch, and is found in germinating grains.

144. Maltose consists of which one of the following?
(a) β - glucose and β - galactose
(b) α – glucose and α - fructose
(c) α – sucrose and β - glucose
(d) glucose and glucose

Manipal-2005

Ans. (d) : Maltose results from the enzymatic hydrolysis of amylose, a homopolysaccharide by the enzyme amylase.
• Maltose is composed of two molecules of glucose joined by an α- 1,4 – glycosidic linkage. It is a reducing sugar that is found in sprouting grain, wheat, corn meal, barley etc.

145. Which one of the following vitamins can be synthesized by bacteria inside the gut?
(a) B (b) C
(c) D (d) K

Haryana PMT-2001

Ans. (a) : Thiamine (B_1), folate (B_9) biotin (B_7), riboflavin (B_2) and panthothenic acid (B_5) are water soluble vitamins that are plentiful in the diet but that are also synthesized by gut Bacteria.
• Healthy adult gut micro biota sustains its own vitamin B_{12} requirement in an in vitro batch fermentation model.

146. The vitamin responsible for antisterile activity is:
(a) Vitamin B (b) Vitamin E
(c) vitamin K (d) Vitamin H

Haryana PMT-2001

Ans. (b) : Vitamin E also know as Tocopherol. It is also know as anti-sterility vitamin because of the fact that it's deficiency results in sterility. It is a fat soluble vitamin with several forms, but α-tocopherol is the only one used by the human body. It is important for reproduction, vision, brain & skin.

147. Which is not carbohydrate?
(a) Cellulose (b) Glucose
(c) Starch (d) Wax

Rajasthan PMT-1995

Ans. (d) : Wax is not a carbohydrate. They are a type of lipids. It is an ester of a long-chain alcohol and a fatty acid. The alcohol may contain 12-32 carbon atoms.

148. Vitamins are
(a) organic compounds (b) hormones
(c) minerals (d) salts

Rajasthan PMT-2001

Ans. (a) : Vitamins are organic molecules that are essential to an organism in small quantities for proper metabolic function. A vitamin is an organic compound, which means it contains carbon.

149. Which of the following vitamins are fat soluble?
(a) A, B, C, K (b) A, B, D, E
(c) A, D, E, K (d) A, D, C, K

WB JEE-2008

Ans. (c) : Vitamins are essential in the diet to promote growth, reproduction and health. The vitamins A, D, E and K are called **fat-soluble vitamins**, because they are soluble in organic solvents and are absorbed and transported in a manner similar to that of fats.

150. Which of the following carbohydrates is not a disaccharide?
(a) Maltose (b) Lactose
(c) Sucrose (d) Galactose

WB JEE-2008

Ans. (d) : Carbohydrates are divided into four types, Monosaccharides, Disaccharides, Oligosaccharides and polysaccharides.
Monosaccharides- Glucose, fructose galactose.
Disaccharides/oligosaccharides- Sucrose, lactase, maltose/Raffinose.
Polysaccharides- Starch, glycogen, cellulose.

151. Which of the following is not a source of vitamin A?
(a) Carrot (b) Mango
(c) Apple (d) Yeast

Rajasthan PMT-2005

Ans. (d) : Vitamin A is also known as **retinol**. They are found in most of the yellow, orange and red fruits and vegetables.
Yeast is a microorganism. It has a high content of vitamin B-complex and amino acid.

F. Protein and its Structure

152. Protein in silk thread is
(a) fibroin (b) keratin
(c) albumin (d) globulin

Punjab MET-2009
Rajasthan PMT-2009
UP CPMT-2003,2009
AMU-2006

Ans. (a) : Silk produced by silk worms (*Bombax mori*) consists of 2 important proteins which are fibrous proteins. They are sericin and fibroin. Sericin is water soluble silk protein whereas fibroin are large complex proteins and make up different types of silk. It is composed of amino acids like glycine, alanine and serine.

153. Select the correct statement regarding the cell membrane from the following
(a) Na^+ and k^+ ions move across cell membrane without carrier proteins

@apna_pdf

(b) Proteins make up 60 to 70% of the cell membrane
(c) Lipids are arranged in a bilayered cell membrane with polar heads towards the inner part
(d) fluid mosaic model of cell membrane was proposed by Singer and Nicolson

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : The correct statement is only (d). Fluid mosaic model of the cell membrane was proposed by singer and Nicolson in 1972. According to this model, cell membranes are quasi-fluid with a viscous lipid bilayer having proteins distributed at places both on the surface and inside.

- Sodium (Na^+) and potassium (K^+) ions move across the cell membrane through carrier proteins.
- Protein make up about 50% of the cell membrane.
- Lipid are arranged in a bilayered cell membrane with the polar heads facing outwards and the non-polar tails facing inwards.

154. Regulatory proteins of a myofibril are
(a) Actin and myosin
(b) Actin and troponin
(c) Myosin and tropomyosin
(d) Troponin and tropomyosin

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : Regulatory proteins of a myofibril are troponin and tropomyosin. Regulatory protiens includes M-protein, gamma-actin, C-protein, troponin and tropomyosin. Troponin and tropomyosin are the regulatory protein in the muscle contraction. These are the protein which regulates the interaction between actin and myosin. Troponin is bound within the filament of the contractile apparatus. Troponin controls muscle contraction by binding calcium ions and changing the position of tropomyosin, which uncovers the myosin-binding sites on actin filaments to relax the muscle.

155. The biological value and Protein Efficiency ration (PER) of egg are
(a) 13.3, 2.5 (b) 96 %, 4.5
(c) 20%, 11.5 (d) 173, 109

AP EAPCET-23.05.2023, Shift-I

Ans. (b) : Biological value measures protein quality by calculating the nitrogen used for tissue formation divided by the nitrogen absorbed from food. This product is multiplied by 100 and expressed as a percentage of nitrogen utilized. The biological value of egg are 96%, it shows a measure of how efficiently dietary protein is turned into body tissue.
Protein efficiency ratio (PER) is based on the weight gain of a test subject divided by its intake of a particular food protein during the test period. It measures the nutritive value of protein sources. Protein efficiency ratio of egg are 4.5.

156. The most abundant protein in the whole of the biosphere
(a) Collagen
(b) RuBisCO (Ribulose bisphosphate carboxylase – oxygenase)
(c) Trypsin
(d) Insulin

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : RuBisCO (Ribulose 1, 5 bisphosphate carboxylase – oxygenase) is the most abundant (10^{17}) protein in the whole of the biosphere. It is found in all photosynthetic organisms. It catalyzes the carboxylation of RuBP and the fixation of CO_2 during glucose synthesis in the calvin cycle.

157. Match List- I With List- II

	List-I		List-II
(A)	Protein	(i)	C=C double bonds
(B)	Unsaturated fatty acid	(ii)	Phosphodiester bond
(C)	Nucleic acid	(iii)	Glycosidic bonds
(D)	Polysaccharide	(iv)	Peptide bonds

Choose the correct answer from the options given below:
(a) (A)-(iv), (B) -(i), (C)-(ii), (D)-(iii)
(b) (A)-(i), (B) -(iv), (C)-(iii), (D)-(ii)
(c) (A)-(ii), (B) -(i), (C)-(iv), (D)-(iii)
(d) (A)-(iv), (B) -(iii), (C)-(i), (D)-(ii)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : Proteins are present in all living organisms and include many essential biological compound such as enzymes, hormones etc. Protein is consist of amino acid residues joined by peptide bonds.

- Unsaturated fatty acids contain one or more double bonds in their hydrocarbon chain.
- Nucleic acids are large biomolecules that play essential role in all cells and viruses, it involves the storage and expression of genomic information.
- Polysaccharide is a carbohydrate formed by long chain of repeating units linked together by glycosidic bonds.

158. Motor protein in the myofibril that is able to convert chemical energy into mechanical energy is
(a) Actin (b) Troponin
(c) Tropomyosin (d) Myosin

TS EAMCET-31.07.2022 Shift-II

Ans. (d) : Myosin is the motor protein in the myofibril that is able to convert chemical energy into mechanical energy. Myosin is a long, rod shaped proteins that forms cross bridges with actin filament.

159. Assertion (A): Active site of an enzyme is a crevice or pocket into which the substrate fits.
Reason (R): In tertiary structure of protein the Polypeptide chain when folds upon itself, the chain criss-crosses itself, and many crevices are formed.
The correct option among the following is:
Options:
(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-30.07.2022 Shift-II

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Ans. (a) : An active site of an enzyme is a crevice or pocket into which the substrate fits and binds to an enzyme. With the binding of substrate the active site activates the enzyme . These sites are present on tertiary structure of protein.
Tertiary structure of protein at which polypeptide chain become function. A number of tertiary structure may fold into a quaternary structure .

160. A protein or polysaccharide molecule that simulates antibody formation is _____ .
(a) Antibiotics (b) Antigen
(c) Exotoxin (d) Toxin

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Antigens are the proteins, peptides or polysaccharides molecules that stimulate the antibody formation.
Antigens are toxin or other foreign substance which induces an immune response in the body especially the production of antibodies.

161. Which one of the following is the most abundant protein in the animals?
(a) Collagen (b) Lectin
(c) Insulin (d) Haemoglobin

NEET-2020 Phase-I
AIPMT-2002

Ans. (a) : The structural protein named as collagen found in tissues of animals is the most abundant protein in the animal. It provides structural support or strength to the skin, muscles, bones and connective tissues.

162. Plastocyanin is a/an containing metalloprotein.
(a) zinc (b) iron
(c) copper (d) cobalt

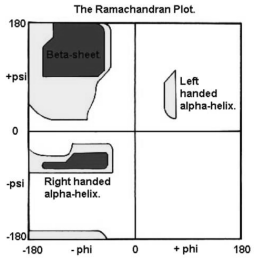
Tripura JEE-2019

Ans. (c) : Plastocyanin is a copper containing metallo-protein. It is found in variety of plants, cyanobacteria and some algae where it participates in photosynthesis. The protein is a prototype of the blue copper proteins, a family of intensely blue-coloured metalloproteins.

163. "Ramachandran plot" is used to confirm the structure of
(a) DNA (b) RNA
(c) Proteins (d) Triacylglycerides

NEET (Odisha)-2019

Ans. (c) :



"Ramachandran plot" is used to confirm the structure of proteins. The Ramachandran plot shows the statistical distribution of the combinations of the backbone dihedral angles ϕ and ψ.
In theory, the allowed regions of the Ramachandran plot show which values of the ϕ and φ angle are possible for an amino acid, X, in a $\alpha - X - \alpha$ tripeptide.

164. In primary structure of protein, the protein thread showed helix with four amino acids S-C-Y-E and a napthalene structure in aminoacid Y. In such condition what will be the direction of helix and what are the positions of amino acids
Options:
(a) From left to right Serine-Cystein-Tyrosine-Glutamic acid
(b) From right to left Serine-Tyrosine- Glutamic acid-Cystein
(c) From left to right Glutamic acid -Tyrosine - Cystein - Serine
(d) From right to left Cystein - Glutamic acid - Tyrosine - Serine

AP EAMCET-24.04.2019 Shift-I

Ans. (a) : The helix having a right-handed direction and the amino acids in the order Serine- Cysteine- Tyrosine-Glutamic acid.

165. Which of the following cannot be synthesized directly from the DNA ?
(a) mRNA (b) tRNA
(c) rRNA (d) Protein

Tripura JEE-2017

Ans. (d) : Protein synthesis is not done by DNA directly but it does take part indirectly. In the nucleus, DNA is transcribed to RNA. The mRNA carries the message out of the nucleus to the ribosome's in the cytoplasm where the tRNA helps translate the message to form a protein.

$$DNA \xrightarrow[\text{Transcription}]{} RNA \xrightarrow[\text{Translation}]{} Protein .$$

166. _____ are the most abundant proteins in the living world.
(a) Ribozyme of plants and collagen of animals
(b) RuBisCO of plants and collagen of animals
(c) PEPcase of plants and keratin of animals
(d) Alcohol dehydrogenase of plants and melanin of animals

Karnataka CET-2014

Ans. (b) : RuBisCO (Ribulose Biphosphate Carboxylase Oxygenase) is not only the most abundant protein in plants but also in the whole biosphere
It is present in the mesophyll cells of C_3 plants and bundle sheath cells of C_4 plants.

167. Globular protein composed of oval or spherical molecule does not act like
(a) Antibodies
(b) Enzyme
(c) Structural protein molecule
(d) Hormone

UP CPMT-2014

Ans. (c): Globular protein composed of oval or spherical molecule does not act like structural protein molecule. They are composed of oval or spherical or globular, which are water soluble and can form crystals. It act as antibodies, enzyme, hormone

168. Even after disruption of all the hydrogen bonds, which structural level of a protein molecules still remains intact :

@apna_pdf

(a) tertiary structure
(b) primary structure
(c) secondary structure
(d) Quaternary structure

AFMC -2011

Ans. (b) : The primary structure of protein contains peptide bond which are covalent in nature. Hence, after disruption of hydrogen bond its structure will remain intact.

169. When breast feeding is replaced by less nutritive food low in proteins and calories, the infants below the age of one year are likely to suffer from :

(a) Pellagra (b) Marasmus
(c) Rickets (d) Kwashiorkor

AIPMT-2009

Ans. (b) :
Marasmus - It occur due to deficiency of protein and calories.
Kwashiorkor - It develops in children whose diet are deficient of protein.
Pellagra - It is due to deficiency of vitamin B_3 (Niacin)
Rickets - It develops in children due to deficiency of vitamin D .

170. Secondary structure of protein, which is attached to lipid layer and lining the pores of cell membrane will be

(a) α-Helix (b) β-Strand
(c) β-Chain (d) Random

AIPMT-1999

Ans. (a) : The alpha helix is a common motif in the secondary structure of proteins and is a right hand-helix conformation in which every backbone N-H group hydrogen bonds to the backbone carbonyl group of the amino acid located four residues earlier along the protein sequence.

171. Nitrogen is the main constituent of

(a) fats (b) protein
(c) polyphosphates (d) carbohydrates

BHU PMT (Screening)-2011

Ans. (b) : Nitrogen is the main constituent of protein. The building blocks of proteins are amino acids, which are small organic molecules that consist of an alpha (central)carbon atom linked to an amino group, a carboxyl group, a hydrogen atom, and a variable component called a **side chain**.

172. Inadequate protein intake leads to kwashiorkor. The subsequent edema is most closely related to inadequate synthesis of which protein?

(a) Gamma globulin (b) Glucagon
(c) Insulin (d) Albumin

WBJEE-2012
DUMET-2009

Ans. (d) : Kwashiorkor is a form of protein malnutrition that is characterized by edema (swelling) weight loss, and skin changes. It is most common in children who are weaned from breast milk and do not get enough protein in their diet. Albumin is a protein that is synthesized by the liver. It help to maintain blood pressure and fluid balance.

173. What is common among amylase, rennin and trypsin?

(a) These all are proteins
(b) These all are proteolytic enzymes
(c) These are produced in stomach
(d) These all hormones

VMMC-2003

Ans. (a) : Amylase, rennin and trypsin are proteins. Amylase is a digestive enzyme predominantly secreted by the pancrease and salivary glands and found in other tissue at very small levels.
Rennin also called chymosin, protein digestive enzyme that curdles milk by transforming caseinogens into insoluble casein.
Trypsin is an enzyme that helps in digesting protein.

174. The water soluble protein associated with silk thread is

(a) fibroin (b) serecin
(c) chitin (d) mucin

AP EAMCET-2006
Manipal-2010

Ans. (b) : Silk thread is obtained from the cocoon of *Bombyx mori*. It mainly contains a water soluble protein called as **serecin** . Fibrin is a protein that makes up a major components of silk and insoluble in natures.

175. Richest source of protein is

(a) Rice (b) Gram
(c) Wheat (d) Glycine max

AMU-2003

Ans. (d) : Glycine max is richest source of protein. Its common name is soyabean, 36-56% of the dried weight in soybean is protein in nature. Glycine and conglycine are the main proteins, which makes up to 80% of total protein.

176. α- helical model of protein was proposed by

(a) Pauling and Corey (b) Stanley
(c) Webster (d) Robert Brown

AMU-2002
BVP-2000

Ans. (a) : Linus Pauling, Robert Corey, and Herman Branson proposed the α-helical and β-sheet (1951), now known to form the back-bones of tens of thousands of proteins. The alpha helix is rod- like structure whose inner section is formed by a tightly coiled main chain, with its side chains extending outward in helical array.

177. Which one of the following is an example of glycoprotein?

(a) Haemoglobin (b) Lecithin
(c) Mucin (d) Casein

AMU-2001

Ans. (c) : Example of glycoprotein is mucin, which are secreted in the mucus of the respiratory and digestive tracts. The sugars when attached to mucins give considerable water- holding capacity and also make them resistant to proteolysis by digestive enzymes.

178. Molecular weight of protein is :

(a) > 12000 (b) < 6000
(c) < 12000 (d) 600-3000

BCECE-2005

@apna_pdf

Ans. (a) : Molecular weight of protein is more than 12000. Protein are larger biomolecules and macromolecules that comprise one or more long chain of amino acid residues .

179. Which one is not protein?

(a) Actin (b) Myosin
(c) Albumin (d) Haematin

Manipal-2011
Rajasthan PMT-1995

Ans. (d) : Haematin is not protein. It is a complex red organic pigment containing iron and other atoms to which oxygen bind whereas, actin, myosin and albumin are proteins.

180. During protein denaturation which of the following is disrupted?

(a) 2D structure (b) 3D structure
(c) Peptide bond (d) AA sequence

BVP-2004

Ans. (b) : Denaturation is the process of modifying the molecular structure of a protein. It involves the breaking of many of the weak linkages or bonds (eg- hydrogen bond) within a protein molecule that are responsible for the highly ordered structure of the protein in its natural state. Protein may be denaturated by chemical action, heat or agitation causing a protein to unfold.

181. The term nucleosome was given by Outdet, Olins and Olins called these particle as nu particles, which histone is absent in nucleosome ?

(a) H_1 (b) H_2
(c) H_3a (d) H_4

Uttarakhand PMT-2006

Ans. (a) : The term nucleosome was given by Outdet, Olins and Olins called these particle as nu particles is H_1. Each nucleosome is composed of a little less than two turns of DNA wrapped around a set of eight proteins called histones, which are known as a histone octamer. Each histone octamer is composed of 2 copies each of the histone protein H2A, H2B, H3 and H4.H_1 is located outside the nucleosome core. It seals the DNA in the nucleosome by binding at site where DNA enters and leaves the nucleosome. H_1 is linker protein not histone protein .

182. The casein is a :

(a) milk protein (b) blood protein
(c) wheat protein (d) fish protein

BVP-2000

Ans. (a) : Casein protein is a protein found in milk that gives milk its white colour. Cows milk consists of around 80% casein protein.

183. Which of the following is the least likely to be involved in stabilising the three-dimensional folding of most proteins?

(a) Hydrogen bonds
(b) Electrostatic Interaction
(c) Hydrophobic interaction
(d) Ester bonds

NEET-2016 Phase-II

Ans. (d) : Ester bond is formed between the sugar and phosphate in a nucleotide and hence is responsible or least involved for the stability also of a polypeptide chain.

184. Maximum application of animal cell culture technology today is in the production of: -

(a) Insulin (b) Interfereons
(c) Vaccines (d) Edible proteins

AIPMT-2003

Ans. (c): Maximum application of animal cell culture technology are used in the production of vaccines. It is a biological preparation that provides active acquire immunity to a particular infections disease vaccine contains weakened or killed forms of the microbe or toxin or one of surface protein.

185. Not all proteins have a :

(a) Primary structure (b) Secondary structure
(c) Tertiary structure (d) Quaternary structure

BCECE-2015

Ans. (d) : The different structures of the proteins are primary, secondary, tertiary and quaternary structures. The quaternary structure of proteins is not commonly found in all types of proteins. They are formed when several protein molecules are joined and function as a single protein molecule.

186. Proteins which help other proteins to fold properly are called:

(a) Chaprones (b) Actins
(c) Porins (d) Synthases

BCECE-2015

Ans. (a) : Chaperones are proteins that assist the conformational folding or unfolding of large proteins or macromolecular protein complexes. It is also involved in the translocation of proteins for proteolysis.

187. Which structural level enables the proteins to function as enzymes?

(a) Primary (b) Secondary
(c) Tertiary (d) Quaternary

AMU-2014

Ans. (c) : Tertiary structural level enables the proteins to function as enzymes. The tertiary structure of protein gives it a very specific shape.

188. A nutrient which is used to build protoplasm is:

(a) fat (b) protein
(c) carbohydrate (d) calcium

Rajasthan PMT-2001

Ans. (b) : A nutrient which is used to build protoplasm is protein. Protoplasm is primarily composed of biomolecules like nucleic acids, proteins, lipids and carbohydrates. It holds in organic salts & molecules of water. It is surrounded by the membrane of the cells.

189. Match the protein with its function and choose the right option.

Protein		Function	
A.	**Collagen**	**i.**	**Glucose transport**
B.	**Trypsin**	**ii.**	**Hormone**
C.	**Insulin**	**iii.**	**Intercellular ground substance**
D.	**GLUT-4**	**iv.**	**Enzyme**

(a) a – 3, b – 4, c – 2, d – 1
(b) a – 4, b – 1, c – 2, d – 3
(c) a – 2, b – 4, c – 1, d – 3

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(d) a – 3, b – 4, c – 1, d – 2
(e) a – 2, b – 1, c – 4, d – 3

Kerala PMT-2013

Ans. (a)

Protein		Function	
A.	Collagen	iii.	Intercellular ground substance
B.	Trypsin	iv.	Enzyme
C.	Insulin	ii.	Hormone
D.	GLUT-4	i.	Glucose transport

G. Nucleic Acid

190. Match the following

List-I	List-II	List-II
(A) Guanine	(I) Cytidylic	(i) Carboxylic amino bond
(B) Cytosine	(II) Purine	(ii) Cytidine
(C) Peptide bond	(III) Heteropolymer	(iii) Angiosperms
(D) Chitin	(IV) Dehydration	(iv) 2C-N rings

(a) A-II-iii, B-III-iv, C-I-ii, D-IV-i
(b) A-II-iii, B-I-iv, C-III-ii, D-IV-i
(c) A-II-iv, B-I-ii, C-IV-i, D-III-iii
(d) A-I-iv, B-II-iii, C-III-ii, D-IV-i

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : The correct match is (c) : A-II-iv, B-I-ii, C-IV-i, D-III-iii

(A) Guanine	(II) Purine	(iv) 2C-N rings
(B) Cytosine	(I) Cytidylic	(ii) Cytidine
(C) Peptide bond	(IV) Dehydration	(i) Carboxylic amino bond
(D) Chitin	(III) Heteropolymer	(iii) Angiosperms

191. Assertion (A) : Loss or gain of a segment of DNA results in alteration in chromosomes.
Reason (B) : Alterations in chromosomes do not result in abnormalities
(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not the correct explanation of A
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-22.05.2023, Shift-I

Ans. (c) : • **Assertion (A) is correct.** Loss or gain of a segment of DNA results in alternation in chromosomes. This is due to chromosomes are made up of DNA. When a segment of DNA is lost or gained, the chromosome is altered.

• **Reason (B) is incorrect.** Alternations in chromosomes can result in abnormalities. This is due to the altered chromosomes may not be able to function properly. Chromosomal alternation means chromosomal abnormalities.

192. The structures that appear as "Beads - on string" in the chromatin and the number of base pairs are
(a) nucleotides, 100 (b) Genes, 200
(c) Kinetochore, 100 (d) Nucleosome, 200

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : The nucleosome that appear as " Beads - on string" in the chromatin and the number of base pairs are 200. The nucleosomes actually represent the beads of beads-on-string structure visible under electron microscope.

193. In the chromatin the charge of a DNA and associated proteins, number of types of histones and copies are
A. Positive, Negative
B. Negative, Positive
C. 4, 2
D. 16, 4
(a) B, D (b) B, C
(c) A, C (d) A, D

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : The charge of the DNA and associated histone proteins in chromatin are negative and positive, respectively. There are 4 type of histone proteins, H_1, H_2A, H_2B and H_3 and each histone protein has 2 copies.

194. The following sequence read the same on two strands in $5^1 \rightarrow 3^1$ direction and $3^1 \rightarrow 5^1$ is called as
5^1 —— GAATTC —— 3^1
3^1 —— CTTAAG —— 5^1
(a) Mismatch sequence
(b) Palindromic nucleotide sequence
(c) Zig-zag Sequence
(d) Recognition sequence

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Restriction endonuclease commonly recognizes DNA sequences that are palindromes i.e it may be read same forward or backward from central axis, In two strands 5' → 3' direction and 3' → direction is read same.
ex. 5-TATA-3 and same from 5' → 3' & 3'→ 5'
Similarly 5' – GAATTC-3'
3' – CTTAAG – 5'

195. Identify the chemical components of nucleic acid
(A) Cysteine
(B) Heterocyclic compound
(C) Tyrosine
(D) Phosphoric acid
(E) Ribulose
(F) Monosaccharide
Options:
(a) A, B, E, F (b) A, B, D
(c) B, D, F (d) A, C, D, F

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : All nucleotides are made of three subunits: one or more phosphate groups, a pentose sugar (five–carbon sugar, either deoxyribose or ribose) and a nitrogen containing base (either adenine, cytosine, guanine, thymine, or uracil).

196. Two consecutive nucleotides of a nucleic acid are linked with_____bond.
(a) glycosidic (b) phosphodiester
(c) peptide (d) hydrogen

MHT CET-01.10.2020 Shift-I

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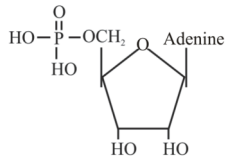
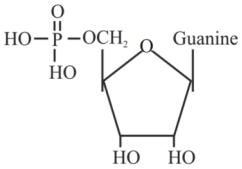
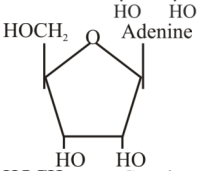
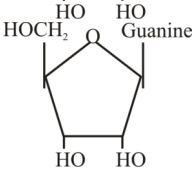
Ans. (b) : Two consecutive nucleotides of a nucleic acid are linked with phosphodiester bond. A phosphadiester bond is a type of covalent bond that is formed between the phosphate group of one nucleotide and the hydroxyl group of the 3' carbon atom of the next nucleotide This bond called the backbone of nucleic acids, such as DNA and RNA

197. Which two are nucleotides :

(A) 

(B) 

(C) 

(D) 

(a) A and B (b) C and D
(c) A and D (d) B and C

AIIMS-26.05.2019 Shift-I

Ans. (a) : The nucleotide is a compound consisting of a nucleoside linked to a phosphate group. Nucleotides form the basic structural unit of nucleic acids such as DNA. Here, A and B two are nucleotides.
Nucleotides contain nitrogenous bases, sugar and phosphoric acids in ester linkage. The nitrogenous base presenting nucleotides are purine (Adenine and Guanine) pyrimidines (Cytosine, Thymine and Uracil). The uracil can only be found in ribonuceotides while thymine base can only be found in deoxyribonucleotides.

198. Nucleic acid occurs in

(a) Cytoplasm
(b) Mitochondria and chloroplast
(c) Golgibody
(d) Lysosomes

Karnataka CET-2007

Ans. (b) : Nucleic acid occurs in organelles like mitochondria and chloroplast.

199. In three dimensional view the molecule of t-RNA is:

(a) L-shaped (b) S-shaped
(c) Y-shaped (d) E-shaped

AIPMT-2000

Ans. (a) : In three dimensional view, the molecule of t-RNA is an L-shaped molecule. The L-shape is formed by the folding of the secondary structure of the t-RNA, which is a clover leaf-shaped structure. The anticodon loop is located at the bottom of the L, and the amino acid attachment site is located at the top of the L.

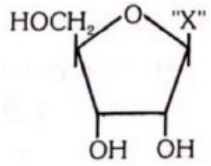
200. Anticodon occurs in:

(a) t-RNA (b) m-RNA
(c) r-RNA (d) DNA

AIPMT-2000

Ans. (a) : Anticodon occurs in t-RNA. A codon or triplet of bases specifies a given amino acid. They are specified by more than one codon. The conversion of codon information into proteins is conducted by transfer RNA. Each transfer RNA (t-RNA) has an anticodon which can base pair with a codon.

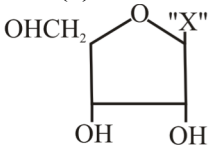
201. Given below is the diagrammatic representation of one of the categories of small molecular weight organic compounds in the living tissues. Identify the category shown and the one blank component 'X' in it:



	Category	Component
(a)	Nucleotide	Adenine
(b)	Nucleoside	Uracil
(c)	Cholesterol	Guanin
(d)	Amino Acid	NH_2

AIPMT (Screening)-2012
JIPMER-2004

Ans. (b) :



= Here "X" is uracil

The given structure represent a ribose sugar. Since, no phosphate groups is attached, hence it is not a nucleotide.
Cholesterol and amino acid does not consist of a sugar hence, it is **nucleoside.**
Structure of DNA/ RNA – nitrogenous base + sugar → nucleoside + phosphate group → nucleotide.

202. Which one of the following is wrong statement?

(a) Phosphorus is a constituent of cell membranes certain nucleic acids and all proteins
(b) Nitrosomonas and Nitrobacter are chemoautotrophs
(c) Anabaena and Nostoc are capable of fixing nitrogen in free-living state also
(d) Root nodule forming nitrogen fixers live as aerobes under free-living conditions

AIPMT (Screening)-2012

Ans. (a) : Phosphorus is a component of cell membrane DNA and RNA but not protein.
Phosphorus is present in cell membrane in the form of phospholipid bilayer.

203. Uridine present only in RNA is a

(a) Pyrimidine (b) Nucleoside
(c) Nucleotide (d) Purine

NEET (Karnataka)-2013

@apna_pdf

Ans. (b) : Uridine present only in RNA is a nucleoside. It is formed by the combination of uracil as a nitrogenous base and ribose sugar.

204. Which one is the sweetest sugar?
(a) Sucrose (b) Glucose
(c) Fructose (d) Maltose
UP CPMT-2013

Ans. (c) : Fructose is the sweetest sugar. It is a monosaccharide or simple sugar, that is found in naturally in fruits, honey and other foods. The chemical formula of fructose is $C_6H_{12}O_6$ which is twice as sweet as sucrose.

205. A nucleoside differs from nucleotide in not having the:
(a) sugar nitrogen base (b) nitrogen base
(c) glucose (d) phosphate group
J&K CET-2002

Ans. (d) : Sugars and nitrogenous bases join to form nucleoside. The bond between sugar and nitrogenous base is known as 'N-glycoside bond", whereas when the phosphate group joins with sugars and nitrogenous base forms nucleotide. The phosphate group join with hydroxyl group of sugar by the phosphoester bond.

206. Nucleic acid can be fragmented by the enzyme:
(a) polymerases (b) nucleases
(c) proteases (d) ligases
J&K CET-2002

Ans. (b) : Nucleic acid can be fragmented by nucleases. It is capable of cleaving phosphodiester bonds between nucleotides of nucleic acid.

207. When a phosphate group is added to a nucleoside, an acid-soluble biomolecule is formed, called
(a) nitrogen base (b) adenine
(c) sugar phosphate (d) nucleotide
Assam CEE-2014
BVP-2001
AIPMT-1991

Ans. (d) : When a phosphate group is added to a nucleoside, an acid-soluble biomolecule is formed, called nucleotide.

208. Which one of the following will be untenable nucleotide combination?
(a) Phosphate – deoxyribose - uracil
(b) phosphate – ribose - uracil
(c) phosphate – ribose - adenine
(d) phosphate – deoxyribose – cytosine.
JIPMER-2012
AMU-1995

Ans. (a) : Nucleotide comprises of nitrogen bases, pentose sugar, phosphate group. The nitrogenous base present in DNA are adenine, guanine, cytosine and thymine
Deoxyribose sugar in DNA comprises thymine base whereas RNA comprises of uracil base.

209. Basis of life are-
(a) nucleic acids (b) proteins
(c) nucleoproteins (d) amino cids
AIIMS-2011
Rajasthan PMT-1995

Ans. (a) : Nucleic acid also known as the basis of life as they store genetic information and are responsible for heredity.
• Nucleic acids are made up of nucleotides. These's are two types
(1) Deoxyribonucleic acid (DNA)
(2) Ribonucleic acid (RNA)

210. Which is wrong about nucleic acids?
(a) DNA is single stranded in some viruses.
(b) RNA is double stranded occasionally.
(c) Length of one helix is 45 Å in B-DNA.
(d) One turn of Z-DNA has 12 bases.
AIPMT-1993

Ans. (c) : The double helical structure of DNA was given by Watson and Crick in 1953. The length of on helix in B-DNA is 34 Å i.e 0.34nm and the helical width is 2nm.
B-DNA is the most common form of DNA. It is a right-handed double helix, with 10 base pairs per turn. B-DNA stabilized by the H-bond between the nitrogenous bases of the two strands.

211. Flow cytometry allows detection of differences in length of nucleic acids as small as about:
(a) 1.5 Mbp (b) 15 Mbp
(c) 25 Mbp (d) 100 Mbp
BCECE-2015

Ans. (a) : Flow cytometry allows detection of differences in length of nucleic acids as small as about 1.5 Mbp. Flow cytometry is a technology that rapidly analyzes single cells while suspended in diffused salt based solution.

212. Single stranded nucleic acid is found in:
(a) E.coli (b) $\phi \times 174$
(c) λ (d) T_4
DUMET-2003

Ans. (b) : Bacteriophage $\phi \times 174$ is small is icosahedral virus that contains a single stranded, closed circular genome. $\phi \times 174$ bacteriophage mostly infects Escherichia coli (E.coli). It has naked capsid (no envelope outside). The $\phi \times 174$ genome is about 5386 nucleotide long.

213. A stretch of DNA consisting of 10-20 bases is most appropriately be called as
(a) polynucleotide (b) nucleotides
(c) nucleosides (d) oligonucleotide
AMU-2014

Ans. (d) : A stretch of DNA consisting of 10-20 bases is most appropriately be called as oligonucleotide. DNA has double helix structure in which two strands are coiled over each other.A oligonucleotide is a short sequence of nucleotides, typically 10-20 bases long. Nucleotides are the building blocks of DNA and RNA, and they consist of a sugar, a phosphate group, and a nitrogenous base.

214. Which biomolecules other than proteins can be catabolised by humans or apes for the production of uric acid?
(a) Carbohydrates (b) Lipids
(c) Nucleic acids (d) Vitamins
AMU-2014

@apna_pdf

Ans. (c) : Uric acid is a product of purine metabolism generated during breakdown of nucleic acid (DNA & RNA) and ATP. Both adenine and guanine nucleotides convert at xanthine. Purines plays an important role in regulation of uric acid metabolism.

215. Nucleic acid is absent in :
(a) nucleus (b) mitochondria
(c) chloroplast (d) golgi body

Rajasthan PMT-1999

Ans. (d) : Golgi apparatus is the cell organelle that do not contain nucleic acid DNA is found in every organelle mitochondria and chloroplasts are semi autonomous organelle i.e they have their own genetic material.

216. Which of the following radioisotope is not suitable for DNA labelling based studies?
(a) H^3 (b) P^{32}
(c) N^{15} (d) S^{35}

J&K CET-2011

Ans. (d) : In the given options, all are used as radioisotopes except S^{35}. S^{35} is suitable for protein labeling based studies because proteins contains sulphur whereas H^3 is present in backbone of sugar as well as nitrogen base and is used for DNA labeling. P^{32} is also present in entire backbone of DNA strands and nitrogenous bases in DNA are composed of N, hence N^{15} is used as DNA labeling.

217. Width of the DNA molecule is
(a) 15 Å (b) 20 Å
(c) 25 Å (d) 34 Å

BVP-2009

Ans. (b) : The width of DNA molecule is 20 Å or 2nm.

218. Condensation product of adenine, ribose and phosphoric acid is named as :
(a) adenosine (b) adenylic acid
(c) adenine phosphate (d) none of these

Punjab MET-2005

Ans. (b) : Condensation product of adenine, ribose & phosphosric acid is adenylic acid and molecular formula of adenine is $C_5H_5N_5$ the nitrogenous bases attaches at first C-sugar.

219. Match the following and choose the correct combination from the options given.

	Column I : Chemical compounds		Column II : Example
(A)	Nitrogen base	(1)	RNA
(B)	Nucleoside	(2)	Thymidylic acid
(C)	Nucleotide	(3)	Cytidine
(D)	Nucleic acid	(4)	Uracil

(a) A - 1 B - 2 C - 3 D - 4
(b) A - 1 B - 3 C - 2 D - 4
(c) A - 4 B - 3 C - 2 D - 1
(d) A - 4 B - 1 C - 2 D - 3
(e) A - 4 B - 2 C - 3 D - 1

Kerala PMT-2014

Ans. (c)

	Column I : Chemical compounds		Column II : Example
(A)	Nitrogen base	(4)	Uracil
(B)	Nucleoside	(3)	Cytidine
(C)	Nucleotide	(2)	Thymidylic acid
(D)	Nucleic acid	(1)	RNA

H. Polysaccharides

220. Co factor that forms coordination bonds with side chains at active site of enzyme
(a) Prosthetic group (b) Co-enzyme
(c) Metal ions (d) Apoenzyme

AP EAPCET-23.05.2023, Shift-I

Ans. (c) : Metal ions are inorganic Co-factors that can form co-ordination bonds with side chains at the active site of an enzyme. These bonds helps to stabilize the enzyme's structure and to bind the substrate.

221. Select the correct sequential steps regarding absorption of fatty acids and glycerol, in intestine.
(A) Micelles are reformed into small protein coated fat globules called chylomicrons.
(B) Micelles move into intestinal mucosa.
(C) Fatty acids and glycerol are incorporated into small droplets called micelles.
(D) Lacteals release the absorbed substances into blood stream.
(E) Chylomicrons are transported into lacteals.
Choose the correct answer from the options given below :
(a) (C), (B), (A), (E), (D)
(b) (B), (C), (E), (A), (D)
(c) (A), (E), (B), (D), (C)
(d) (D), (E), (B), (C), (A)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : It represents the correct sequential steps regarding absorption of fatty acid and glycerol in intestine that is –
- Fatty acid and glycerol are incorporated into small droplets called micelles.
- Micelles move into mucosa.
- Micelles are reformed into small protein coated fat globules called chylomicrons.
- Chylomicrons are transported into lacteals.
- Lacteals release the absorbed substances into blood stream.

⇒ So, these are the correct sequence of absorption of fatty acid and glycerol.

222. Inulin is a polymer of :
(a) Amino acids (b) Glucose
(c) Fructose (d) Galactose

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : Inulins are group of naturally occurring polysaccharides produced by many types of plants.
• Inulin is a polymer of fructose. It is not metabolized in human body and is readily filtered through kidney.

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223. Cellulose does not form blue colour with Iodine because

(a) It breaks down when iodine reacts with it.
(b) It is a disaccharide.
(c) It is a helical molecule.
(d) It does not contain complex helices and hence cannot hold iodine molecules.

NEET (UG) 07.05.2023

Ans. (d) : Cellulose is a polymer of glucose unit bonded together cellulose insoluble in water

- Cellulose is made up of a series of sugar molecules linked together in a long chain. It found in all plant foods.
- Cellulose does not have a helical structure. It does not bind to iodine to form a colored product.

224. True statement for cellulose molecule :

(a) β–1–4 linkage, unbranched
(b) β–1–4 linkage, branched
(c) α–1–4 linkage, branched
(d) β–1–6 linkage, unbranched

APEAMCET-2022
AIPMT-1998

Ans. (a) : Cellulose molecule has β-1-4 linkage unbranched, polymer of glucose. Cellulose is a structural polysaccharide. It is an unbranched polymer of glucose unlike starch which is also a polymer of glucose but shows branching.
It is highly biodegrable and insoluble in water.

225. Most abundant organic compound on earth is

(a) Protein (b) Cellulose
(c) Lipids (d) Steroids

J & K CET-2022
MHCET-2020 / AIPMT-2001

Ans. (b) : Cellulose is the most abundant organic compound, biopolymer and polysaccharide found on earth. It is found in the cell walls of plants, and it is also the main component of wood.

226. A dehydration reaction links two glucose molecules to product maltose. If the formula for glucose is $C_6H_{12}O_6$ then what is the formula for maltose?

(a) $C_{12}H_{24}O_{11}$ (b) $C_{12}H_{20}O_{10}$
(c) $C_{12}H_{24}O_{12}$ (d) $C_{12}H_{22}O_{11}$

NEET-2022

Ans. (d) : Maltose is a disaccharide formed by dehydration process i.e. synthesis by elimination on one water molecules to from a glycosidic bond in between two glucose molecules.

227. Monomer of Insulin

(a) Glucose (b) Fructose
(c) Arabinose (d) Galactose

AP EAPCET-11.07.2022 Shift-I

Ans. (b) : Insulin is a monomer of fructose. It is a polypeptide hormone made by pancreatic β-cell. The structure of insulin is made up of a dimers of two peptide chains linked with two disulfide bonds. It regulates metabolism of carbohydrates and protein by promoting absorption of glucose from blood into liver, fat and skeletal muscle cells glucose is converted into glycogen via glycogensis or fat via lipogenesis.

228. Match List-I with List-II

	List-I (Biological Molecules)		List-II (Biological functions
(A)	**Glycogen**	**(i)**	**Hormone**
(B)	**Globulin**	**(ii)**	**Biocatalyst**
(C)	**Steroids**	**(iii)**	**Antibody**
(D)	**Thrombin**	**(iv)**	**Storage product**

Choose the correct answer from the options given below:

(a) (A) - (iv), (B) - (iii), (C) - (i), (D) - (ii)
(b) (A) - (iii), (B) - (ii), (C) - (iv), (D) - (i)
(c) (A) - (iv), (B) - (ii), (C) - (i), (D) - (iii)
(d) (A) - (ii), (B) - (iv), (C) - (iii), (D) - (i)

NEET-2022

Ans. (a) :

	List-I (Biological Molecules)		List-II (Biological functions
(A)	Glycogen	(iv)	Storage product
(B)	Globulin	(iii)	Antibody
(C)	Steroids	(i)	Hormone
(D)	Thrombin	(ii)	Biocatalyst

229. Match the following lists.

List-I	List-II	List-III
A. Deoxyribose	**i. Gums**	**I. Fatty acids**
B. Lipids	**ii. $C_5H_{10}O_4$**	**II. True macro molecules**
C. Polymeric substances	**iii. Trypsin**	**III. Cellulose**
D. Polypeptides	**iv. Glycerol**	**IV. Carbohydrate**

The correct match is :

	A	B	C	D
(a)	ii, IV	iii, I	i, III	iv, II
(b)	iii, II	ii, I	i, III	iv, IV
(c)	iv, I	i, III	iii, IV	ii, II
(d)	ii, IV	iv, I	i, III	iii, II

TS EAMCET-09.08.2021 Shift-II

Ans. (d) :

List-I	List II	List-III
A. Deoxy ribose	(ii) $C_5H_{10}O_4$	(iv) Carbohydrate
B. Lipids	(iv) Glycerol	(i) Fatty acids
C. Polymeric substance	(i) Gum	(iii) Cellulose
D. Polypeptides	(iii) Trypsin	(ii) True macro-molecule

230. Which of the followings are the metabolic products of glucose and glutamine?

(a) CO_2 and NH_3 (b) CO_2 and lactate
(c) Lactate and ammonium (d) Lactate only

SRM JEEE-2019

Ans. (c) : Lactate and ammonium are the metabolic products of glucose and glutamine.
Ammonium lactate is a compound with formula NH_4 $(C_2H_4(OH)COO)$. It is the ammonium salt of lactic acid. It has mild anti-bacterial properties. Ammonium lactate is the chemical combination of lactic acid and ammonium hydroxide.

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231. Which one of the following sugar does not have same empirical formula as that of carbohydrate?

(a) Maltose (b) Galactose
(c) Digitoxose (d) Glycogen

MHT CET-2019

Ans. (c) : Digitoxose, component of cardiac glycosides found in *Digitalis purpurea*. It is a glycoside made up of one molecule of digioxigenin and three molecules of sugar digitosose. Chemical formula is $C_6H_{12}O_4$ obtained by hydrolysis of glycoside of *Digitalis*. They are used as conventional drugs for over 200 years.

232. Polysaccharides can be tested by

(a) Iodine (b) HCl
(c) KCl (d) KNO_3

AIIMS-26.05.2019 Shift-II

Ans. (a) : Polysaccharides can be tested by iodine. The basis for this test is that starch is a coiled polymer of glucose, iodine interacts with these coiled molecules and becomes bluish-black. The iodine test is used for distinguishing between starch, glycogen, and carbohydrates.

233. Which one of the following carbohydrates is a heteropolysaccharide?

(a) Cellulose (b) Starch
(c) Glycogen (d) Hyaluronic acid

MHT CET-2018

Ans. (d) : Carbohydrate are homopolysaccharides or heteropolysaccharides. Heteropolysaccharides contains two or more units of monosaccharides or polysaccharides, do not have a fixed molecular weight. Hyaluronic acid made up of N-acetyl-glucosamine -6-phosphate and glucoronic acid. It is found in connective tissue and skin. It functions in signaling and also acts as lubrication of synovial joints and helps in joint movement.

234. Choose the correct statements

(I) Inulin is a polymer of glucose
(II) Cellulose does not contain complex helices
(III) Starch is a polymer with helical secondary structure
(IV) Store house of energy in animal tissue is glycogen

Options:

(a) I, IV, III (b) I, III, II
(c) II, IV, I (d) II, III, IV

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : (i) Inulin is a polymer of fructose.
(ii) Cellulose does not contain complex helices and hence cannot hold iodine and remain colourless.
(iii) Starch can hold iodine molecules in its helical secondary structure and hence it gives colour with iodine.
(iv) Glycogen is a homopolysaccharide found in the liver and muscles of animals, where it is used to store energy.

235. Marcomolecule of Chitin are -

(a) Simple polysaccharide
(b) Nitrogen containing polysaccharide
(c) Phosphorus containing polysaccharide
(d) Sulphur containing polysaccharide

NEET-2013

Ans. (b) : Chitin is a nitrogen containing modified polysaccharide made up of units of N-acetyl-d-glucosamine. Macromolecule chitin is an example complex structural heteropolysaccharide.
It has nitrogen containing glucose derivatives such as N-acetyl glycosamine. It ispresent as the structural components of fungal cell and exoskeleton of arthopods etc.

236. Ribose sugar is present in

(a) RNA only
(b) RNA polymerase and ATP
(c) RNA and ATP
(d) RNA polymerase, RNA and ATP

Karnataka CET-2009

Ans. (c) : Ribose sugar is present in RNA and ATP. RNA is a nucleic acid that is made up of ribonucleotides. Ribonucleotides consists of ribose sugar, nitrogenous base and phosphoric acid. ATP (Adenosine triphosphate) is a ribonucleotide that is used to store transfer energy to cell.

237. Benedicts reagent test is conducted to confirm the presence of

(a) Reducing sugars
(b) Proteins
(c) Polysaccharides like starch
(d) Lipids

Karnataka CET-2008

Ans. (a) : Benedicts reagent test is conducted to confirm the presence of reducing sugars. This reagent is a complex mixture of sodium citrate, sodium carbonate and the pentahydrate of copper (II) sulphate. Benedict's reagent changes colour of reducing sugars from clear blue to bright red.

238. In a polysaccharide, number of monosaccharides are linked by

(a) peptide bond (b) phosphoester bond
(c) glycosidic bond (d) hydrogen bond

Karnataka CET-2016

Ans. (c) : Two monosaccharide units can be joined together by a glycosidic bond The glycosidic bond is formed between the anomeric carbon of one monosaccharide and a hydroxyl group of another. Starch is the best example of glycosidic bond.

239. Amylopsin acts upon

(a) Polypeptides
(b) Polysaccharide in any medium
(c) Polysaccharide in acidic medium
(d) Polysaccharide in alkaline medium

BHU-2007
Manipal-2011
BCECE-2011

Ans. (d) : Amylopsin is an enzyme that breaks down starch into sugar. It is produced by the pancreas and is present in pancreatic juice. It is most active in an alkaline medium, such as small intestine. It is a pancreatic enzyme having pH of 2 to 3 and digests starch. It is also known as pancreatic amylase

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240. Which one is not a carbohydrate?
(a) Starch (b) Chitin
(c) Glycogen (d) Methionine
Uttarakhand PMT-2011

Ans. (d) : Starch, Chitin, Glycogen are carbohydrates whereas methionine, is an amino acid. It is a rare amino acid and only amino acid used as precursor in both animal and plant kingdom.

241. Mannitol is
(a) amino acid (b) amino alcohol
(c) sugar alcohol (d) sugar acid
WB JEE-2011

Ans. (c) : Mannitol is sugar alcohol used as sweetener and medication. As a medication, used to decrease pressure in eyes and to lower increased intracranial pressure. It helps to produce more urine and used to treat people with kidney failure, to remove excess water & toxins from body.

242. Which one is hexose sugar?
(a) Mannose (b) Galactose
(c) Both [a] and [b] (d) Cellulose
BCECE-2001

Ans. (c) : Hexose sugar is a monosaccharide with 6 carbon atoms. The chemical formula of hexose is $C_6H_{12}O_6$, common examples of hexose sugars are glucose, galactose, mannose and all these are aldoses whereas fructose is ketose. Glucose, galactose and mannose are epimers i.e they differ from one another at units of symmetry.

243. Which one of the following enzymes has no role in protein synthesis?
(a) RNA polymerase
(b) Restriction endonuclease
(c) Amuno acyl synthetase
(d) Peptidyl transferase
JCECE-2010

Ans. (b) : Restriction endonuclease are also know as **biological scissors**. They are not involve in protein synthesis instead they acts as a scissor i.e they cut DNA fragments at a specific site. They are of 3 types – Type I, Type II and Type III, Only Type II restriction endonucleases are used in DNA technology and gene cloning.

244. The organic compound having polyhydroxy aldehydes or ketones is
(a) carbohydrate (b) lipid
(c) protein (d) vitamin.
AMU-1995

Ans. (a) : The organic compound having polyhydroxy aldehydes or ketones is carbohydrate. Polyhydroxy aldehydes or polyhydroxy ketone are those carbon compounds in which number of carbon unit is high where more than one C atom has alcohol or hydroxyl group and terminal C has either aldehyde or ketone group.

245. Which one of the following is a non-reducing carbohydrate?
(a) Maltose (b) Sucrose
(c) Lactose (d) Ribose 5- phosphate
AIPMT-2014

Ans. (b) : Sucrose is a non-reducing sugar which is a carbohydrate that is not oxidized by a weak oxidizing agent such as the Tollen's reagent in basic aqueous solution. The characteristic property of non-reducing sugars is that, they do not generate any compounds containing an aldehyde group in aqueous medium.

246. Table sugar is consist of
(a) lactose (b) sucrose
(c) maltose (d) glucose
UP CPMT-2009

Ans. (b) : Table sugar consists of sucrose. It is made of disaccharide. Sucrose (table sugar) is an equal combination of glucose and fructose. It comes from sugarcane and beets which contain sucrose. It is a type of carbohydrate disaccharide made of equal parts of two monosaccharides.

247. Starch and cellulose are the compounds of many units of
(a) amino acids (b) glycerol
(c) simple sugars (d) fatty acids
AIIMS-1996

Ans. (c) : Starch and cellulose are the compounds of many units of simple sugars. Starch is glucose polymer of amylase and amylopectin. Natural starch consists of 10-30% amylase and 70 – 90 % anylopectin. Amylose is a linear polysaccharide composed entirely of D-glucose units joined by α-1,4 glycosidic linkages. Cellulose is fibrous carbohydrates found in all plants and is structural component of plant cell walls. Cellulose is linear polymer of glucose joined by β, 1-4 glycosidic bond. Starch and cellulose both belongs to polysaccharides.

248. Identify the trisaccharide
(a) Mannose (b) Maltose
(c) Raffinose (d) Galactose
Uttarakhand PMT-2010

Ans. (c) : Raffinose is a trisaccharide in which glucose acts as monosaccharide bridge between galactose and fructose. It has both α and β glycosidic bonds and hydrolyzed to d-galactose and, sucrose via engyme α-glycosidic activity. It is found in beans, cabbage, brussel sprouts, broccoli.

249. When a man starves, he first of all consumes to the stored:
(a) protein (b) carbohydrate
(c) glycogen (d) fat
JIPMER-1996

Ans. (c) : Glycogen is a stored form of glucose made up of many glucose molecules. Glucose is the main sources of energy and comes from carbohydrate. Glycogen is stored in liver and muscles. Muscles needs a lot of energy to move, healing etc and uses stored glycogen for metabolism during starvation/fasting.

250. Polysaccharides, polypeptides and polynucleotides have in common that they all
(a) contain amino acid
(b) are formed in condensation reactions
(c) contain nitrogen
(d) come out in acid soluble pool
MGIMS Wardha-2015

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Ans. (b) : Condensation reaction is a type of chemical reaction in which two molecules are combined to form a single molecule with loss of small molecules such as water. Polysaccharides are formed with condensation of many glucose units.
Polypeptide chain is generated by condensation of amino acids and release of water.

251. Glucose is:
(a) Pyranose pentose sugar
(b) Furanose pentose sugar
(c) Ketose hexose sugar
(d) Aldose hexose sugar

MP PMT-2013

Ans. (d) : Glucose is aldose hexosoe sugar. It can exists in an open chain as well as ring form. Chemical formula of glucose is $C_6H_{12}O_6$. Galactose & fructose are structural isomers of glucose

252. Which of the following statements is wrong for sucrose?
(a) It is a disaccharide
(b) It is a non - reducing sugar
(c) It accumulates in the cytoplasm
(d) It is comprised of maltose and fructose

WB JEE-2014

Ans. (d) : Sucrose is a disaccharide and composed of glucose and fructose subunits. It is produced naturally in plants and main constituent of white sugar.
Sucrose contains no anomeric hydroxyl groups, hence grouped as non-reducing sugar.

253. A complex polysaccharide produced from sucrose by the bacterium Leuconostoc mesenteroides is
(a) Chitin (b) Starch
(c) Cellulose (d) Dextran

BVP-2007

Ans. (d) : A complex polysaccharide produced from sucrose by the bacterium Leuconostoc mesenteroides is dextran. It is a low molecular weight polymer of glucose.

I. Nature of Bond

254. Match List-I with List-II.

	List-I		List-II
(A)	**Protein**	**(i)**	**C = C double bonds**
(B)	**Unsaturated fatty acid**	**(ii)**	**Phosphodiester bonds**
(C)	**Nucleic acid**	**(iii)**	**Glycosidic bonds**
(D)	**Polsyaccharide**	**(iv)**	**Peptide bonds**

Choose the correct answer from the options given below

	(A)	(B)	(C)	(D)
(a)	(iv)	(iii)	(i)	(ii)
(b)	(iv)	(i)	(ii)	(iii)
(c)	(i)	(iv)	(iii)	(ii)
(d)	(ii)	(i)	(iv)	(iii)

NEET-2021

Ans. (b) :

	List-I	List-II
(A)	Protein	Peptide bonds
(B)	Unsaturated fatty acid	C = C double bonds
(C)	Nucleic acid	Phosphodiester bonds
(D)	Polysaccharide	Glycosidic bonds

255. DNA polymerase links nucleotide by forming which type of bond:
(a) Phosphodiester bond (b) Hydrogen bond
(c) Glycosidic bond (d) Ester bond

AIIMS-25.05.2019 Shift-I
CG PMT-2005

Ans. (a) : DNA polymerase links nucleotide by forming which type of bond Phosphodiester bond. These bonds in DNA polymers connect the 5' carbon of one nucleotide to the 3' carbon of another.

256. Match the given bonding groups and their respective bond.

List-I [Bonding groups]	**List-II [Bonds]**
(A) 2C-atoms of adjacent monosaccharides	**(I) Ionic bond**
(B) Carboxyl and amino group of two aminoacids	**(II) Hydrogen bond**
(C) Two nucleotides	**(III) Peptide bond**
(D) Phosphate and hydroxyl group of sugar in DNA	**(IV) Ester bond**
	(V) Glycosidic bond

The correct answer is
Options :

	A	B	C	D
(a)	I	II	III	IV
(b)	I	III	II	IV
(c)	I	IV	II	III
(d)	I	II	IV	III

AP EAMCET-28.04.2017 Shift-I

Ans. (b) :

(A)	2C-atoms of adjacent monosaccharides	(I) Ionic bond
(B)	Carboxyl and amino group of two amino acids	(III) Peptide bond
(C)	Two nucleotides	(II) Hydrogen bond
(D)	Phosphate and hydroxyl group of sugar in DNA	(IV) Ester bond

257. Two polynucleotide chains are held together by which of the following bonds?
(a) Phosphate (b) Hydrogen
(c) Disulphide (d) None of the above

Assam CEE-2014

Ans. (b) :DNA molecule made of two strands of nucleotides which is linked by hydrogen bonds between complementary base pairs.

258. Lipase breaks the
(a) ester bonds (b) peptide bonds
(c) hydrogen bonds (d) glycosidic bonds

Uttarakhand PMT-2011

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Ans. (a) : Lipase catalyzes the hydrolysis reaction and breaks down ester bonds of lipids and fats and converts into fatty acids, glycerol, and other alcohols. Lipase perform essential roles in digestion, transport processing of dietary lipids.

259. How many phosphodiester bonds are there in ATP?

(a) 3 (b) 2
(c) 1 (d) 0

BCECE-2015

Ans. (d) : In ATP no phosphodiester bond are present. ATP has only two high energy bonds i.e. phosphoanhydride bond. ATP is a nucleoside triphosphate consisting of nitrogen base (Adenine), ribose sugar and three serially bonded phosphate group It is known as ‘‘Energy currency of cell”

260. In DNA helix, cytosine is paired with guanine by:

(a) three hydrogen bonds
(b) phosphate bond
(c) two hydrogen bonds
(d) covalent bond

AP EAMCET-1998

Ans. (a) : In the DNA double helix structure, adenine pairs with the thymine by two hydrogen bonds and guanine paired with cytosine by three hydrogen bonds.

261. Study the following lists

List-I		List-II	
(A)	**Hydrogen bond**	**(I)**	**Adenine-Deoxyribose**
(B)	**N-glycosidic linkage**	**(II)**	**Glucose-Fructose**
(C)	**Phosphodiester bond**	**(III)**	**Leucine-Glycine**
(D)	**Peptide bond**	**(IV)**	**Nucleotide-Nucleotide in polynucleotide chain**
		(V)	**Guanine-cytosine on opposite strands of DNA**

The correct match is

	A	B	C	D
(a)	(V)	(I)	(IV)	(III)
(b)	(II)	(I)	(V)	(III)
(c)	(V)	(III)	(IV)	(II)
(d)	(I)	(IV)	(V)	(II)

TS EAMCET-15.05.2016

Ans. (a) :	
Hydrogen bond	Guanine-cytosine on opposite strands of DNA
N-glycosidic linkage	Adenine-Deoxyribose
Phosphodiester bond	Nucleotide-Nucleotide in polynucleotide chain
Peptide bond	Leucine-Glycine

262. Which one of the following is catalysed by the presence of enzyme peptidyl transferase ?

(a) Peptide bond formation
(b) Transfer of a ammo acid
(c) Transfer of ribosomes units
(d) Transfer of peptide bonds

BVP-2006

Ans. (a) : Peptide bond formation is catalysed by the presence of enzyme peptidyl transferase. It is catalyzes peptide bond formation between amino acid of the t-RNA during translation process of protein synthesis.

J. Concept of Metabolism and Living State

263. Match the following

List-I (Element)		List-II (Activator of)	
A.	**Iron**	**I.**	**RUBISCO**
B.	**Manganese**	**II.**	**Cytochrome ‘C’ oxidase**
C.	**Magnesium**	**III.**	**Nitrogenase**
D.	**Molybdenum**	**IV.**	**Catalase**
		V.	**IAA oxidase**

(a) A – III, B – IV, C – I, D - II
(b) A – V, B – II, C – I, D - III
(c) A – IV, B – V, C – I, D - III
(d) A – II, B – III, C – I, D - V

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : The correct match is (c) : A – IV, B – V, C – I, D - III

A.	Iron	IV.	Catalase
B.	Manganese	V.	IAA oxidase
C.	Magnesium	I.	RUBISCO
D.	Molybdenum	III.	Nitrogenase

264. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals because of all of these

(a) enhance oxidative metabolism
(b) are conjugated proteins
(c) are exclusively synthesised in the body of a living organism as at present
(d) help in regulating metabolism

NEET AIPMT-2005
AIIMS-2008

Ans. (d) : Enzymes, vitamins and hormones can be classified into a single category of biological chemicals because of all of these help in regulating metabolism. They have a role in regulating in the metabolism of a living organism Hence, they are classified in a single category of biological chemicals. Vitamins, hormones, enzymes, ATP, carbohydrate lipids, nucleic acids and proteins are only a few examples.

265. Following technique uses radioactive precursors for observing metabolic activities of macromolecules, is

(a) chromatography
(b) density gradient centrifugation or cell fractionation

@apna_pdf

(c) autoradiography
(d) electron microscope

DUMET-2004

Ans. (c) : Autoradiography is a photographic method to detect radioactive materials. Autoradiograph is an image on X-ray film, produced by emissions of β-particles or gamma rays from a distribution of radioactive substance it is used to study metabolism of plants and animals.

266. Breaking down of organic compounds in the body and liberation of energy is :
(a) a catabolic process (b) an anabolic process
(c) a digestive process (d) none of the above

Rajasthan PMT-2001

Ans. (a) : Breakdown of organic compounds in the body and liberation of energy is a catabolic process.

K. Enzymes and Enzyme Action

267. Disaccharide Lactose on hydrolysis forms galactose and glucose. The enzyme related is
(a) Lactase (b) permease
(c) Transacetylase (d) β-galactosidase

TS EAMCET 10.05.2023 Shift-I

Ans. (d) : β-galactosidase catalyzes the hydrolysis of the glycosidic bond in lactose, resulting in the release of galactose and glucose.
Lactose → Glucose + Galactose
Lactose is a disaccharide which, hydrolyzes into glucose and galactose by breaking of glycosidic bonds.

268. Below reaction is catalyzed by the enzyme
$CO_2 + H_2O \rightarrow H_2CO_3$
(a) Enolase (b) Aconitase
(c) Fumarase (d) Carbonic anhydrase

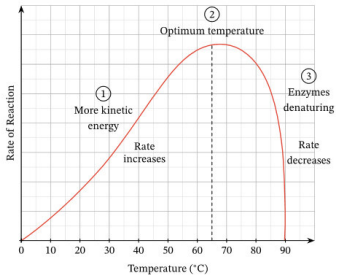
AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Carbonic anhydrase catalyzes the conversion of CO_2 + H_2O to H_2CO_3 and maintain the balance of CO_2 and bicarbonate ions in the body.

269. Enzymes are denaturated by
(a) Low Ph
(b) High substrate concentration
(c) Low temperature
(d) heat

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Enzyme are denatured at high temperature of heat because heat disrupts their molecular structures and affects their active sites. Enzymes are protein molecules that get denatured at high temperatures. High heat breaks hydrogen and ionic bonds leading to disruption in enzyme shape.



270. Given below are two statements :
Statement I : Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat.
Statement II : When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor.
In the light of the above statements, choose the correct answer from the options given below :
(a) Statement I is false but Statement II is true.
(b) Both Statement I and Statement II are true.
(c) Both Statement I and Statement II are flase.
(d) Statement I is true but statement II is false.

NEET (UG) 07.05.2023

Ans. (b) : At very high temperature, enzymes because they are made of protein, can be denatured or destroyed. The material on which the enzyme will act is called the substrate.
• An inhibitor may bind to an enzyme and block binding of the substrate, for example, by attaching to the achieve site this is called competitive inhibition, because the inhibitor "completes" with the substrate for the enzyme.

271. Assertion (A) : Active site of an enzyme is a crevice or pocket into which the substrate fits.
Reason (R) : In tertiary structure of protein chain when folds upon itself, the chain criss-crosses itself, and many cervices are formed.
The correct option among the following is:
(a) (A) is true, (R) is true and (R) is the correct explanation of (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-30.07.2022 Shift-II

Ans. (b) : Active site of an enzyme is a crevice or pocket into which the substrate fits. In tertiary structure of protein chain when folds upon itself, the chain criss – crosses itself and many crevices are formed. Tertiary structure of protein gives a very specific shape to proteins.

272. Enzymes are functional at ——— temperature in human body
(a) 17° C (b) 27° C
(c) 37° C (d) 47° C

AP EAMCET-12.07.2022 Shift-II

Ans. (c) : Enzymes are functional at 37°C temperature in human body. They are temperature sensitive and are not functional at low temperatures. At very high temperature, enzymes undergo denaturation.

273. In the enzyme which catalyses the breakdown of:
$H_2O_2 \rightarrow H_2O + O_2$
the prosthetic group is:
(a) Nicotinamide adenine dinucleotide
(b) Haem

@apna_pdf

(c) Zinc
(d) Niacin

NEET (Re-Exam)-04.09.2022

Ans. (b) : Haem is the prosthetic group associated with enzymes that catalyze reactions, where oxygen molecules are involved in the breakdown.

274. The term Enzyme was proposed by _____
(a) W F Khune (b) E Fisher
(c) D Koshland (d) E Buchner

AP EAPCET-12.07.2022 Shift-I

Ans. (a) : The discovery of enzyme is credited to Eduand Buchner.
The name of enzyme was coined in 1878 by W F Khune. Enzyme are proteins that function as biological catalyst.

275. _____enzyme converts sucrose into glucose and fructose
(a) Zymase (b) Invertase
(c) Isomerase (d) Maltase

AP EAPCET-11.07.2022 Shift-I

Ans. (b) : The Enzyme Invertase is used to convert sucrose (cane sugar) into glucose and fructose. Invertase is also know as sucrose and saccharase.

276. Match the following lists:

List-I	List-II	List-III
A) Coenzymes are organic compound	i) No structure similarities	I) Ribose-5 phosphate isomerase
B) Isomerases	ii) Differ from inorganic catalysis	II) During catalysis
C) Non-competitive enzyme inhibition	iii) Catalyzing inter conversion of optical positional isomers	III) Operates at high Temperatu re also
D) Enzyme catalysts	iv) With the apoenzyme only as a transient	IV) Metal ion of copper

The correct match is

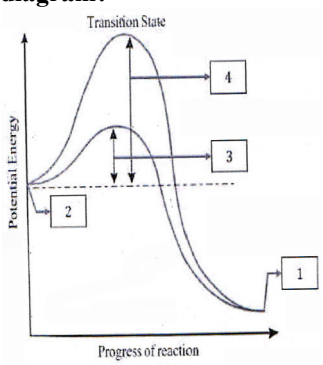
	A	B	C	D
(a)	iv, II	iii, I	i, IV	ii, III
(b)	iii, III	ii, I	iv, III	i, IV
(c)	vi, II	iii, I	i, III	ii, IV
(d)	iii, III	ii, IV	iv, I	I, II

TS EAMCET-10.08.2021 Shift-I

Ans. (a) :

List-I	List-II	List-III
A) Coenzymes are organic compound	iv) With the apoenzyme only as a transient	II) During catalysis
B) Isomerases	iii) Catalyzing inter conversion of optical positional isomers	I) Ribose-5 phosphate isomerase
C) Non-competitive enzyme inhibition	i) No structure similarities	IV) Metal ion of copper
D) Enzyme catalysts	ii) Differ from inorganic catalysis	III) Operates at high Temperature also

277. Identify the labelled parts 1, 2, 3, 4 in the Concept of Activation energy shown in the below diagram?



(a) 1-Activation energy with enzyme, 2-Product, 3-Substrate, 4-Activation energy without enzyme
(b) 1-Product, 2-Substrate, 3-Activation energy with enzyme, 4-Activation energy without enzyme
(c) 1-Substrate, 2-Activation energy with enzyme, 3-Product, 4-Activation energy without enzyme
(d) 1-Activation energy without enzyme, 2-Activation energy with enzyme, 3-Substrate, 4-Product

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : The structure of substrate gets transformed into the structures of products. Activation energy without enzyme is very high, whereas enzyme provides the path of lower activation energy.

278. Match the following-

Enzymes		Functions	
A.	Lyases	i.	Oxido reduction
B.	Isomerases	ii.	Link compounds
C.	Dehydrogenases	iii.	Transfer of group
D.	Ligases	iv.	Interconversion
		v.	Removal of groups

Options:

	A	B	C	D
(a)	v	iv	i	ii
(b)	iv	v	ii	iii
(c)	iii	ii	iv	i
(d)	i	iii	v	iv

AP EAMCET-03.09.2021 Shift-II

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Ans. (a) :

Enzymes		Functions	
A.	Lyases	v.	Removal of groups
B.	Isomerases	iv.	Interconversion
C.	Dehydrogenases	i.	Oxido reduction
D.	Ligases	ii.	Link compounds

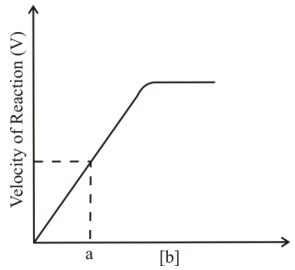
279. Enzymes can react with acidic or basic substances due to their____nature.

(a) Amorphous (b) Competitive
(c) Colloidal (d) Amphoteric

MHT CET-2019

Ans. (d) : Enzyme can react with both acidic or basic substance due to their amphoteric nature. This flexibility helps them function effectively over a range of pH conditions, as they contain amino acid residues that can donate or accept protons.

280.



In the above figure representing an enzyme catalysed reaction 'a' and 'b' respectively are

(a) Michaelis Menten constant and substrate concentration
(b) $\frac{1}{2}V_{max}$ and K_m
(c) $\frac{1}{2}V_{max}$ and substrate concentration
(d) K_m and [E]

TS EAMCET-03.05.2018 Shift-I

Ans. (a) : Michaelis Menten constant (K_m) is a constant indicating the substrate concentration at which an enzyme catalyzed reaction attains half of its maximum velocity. Lower the value of K_m greater the speed of reaction.

281. Study the following

(I)	**K_m value**	**Affinity of the enzyme**	**Inverse measure enzyme affinity**
(II)	**Hydrolases**	**P-O bonds**	**Linking 2 compounds**
(III)	**Transferases**	**Transfer of a group**	**Inhibitor of reaction**
(IV)	**Emil Fischer**	**Lock and key hypothesis**	**Formation of ES complex**

The correct combinations are

(a) I, IV (b) II, III
(c) I, III (d) II, IV

AP EAMCET-25.04.2018 Shift-I

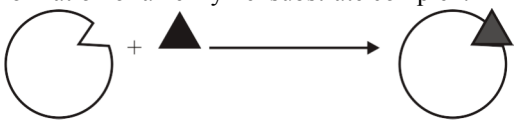
Ans. (a) : The kinetics of enzyme catalyzed reaction was explained by Michaelis and Menten in 1913. Michaelis-Menten theory of enzyme kinetics is the simplest one that accounts for kinetic properties of many enzymes.

Michaelis-Menten derived following equation-

$$V_0 = \frac{V_{max}[S]}{K_m + [S]}$$

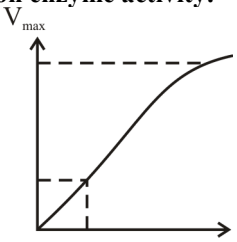
Fischer's lock and key model:- According to this model, complementary structural features are present between enzyme and substrate and the active site is pre-shaped to fit the substrate.

The substrate can fit into its complementary site on the enzyme as a key fits into a lock. This results in the formation of an enzyme substrate complex.



Enzyme Substrate Enzyme substrate complex

282. The following graph shows concentration of substrate on enzyme activity:



What does the Y-axis represent?

(a) Temperature
(b) Velocity of reaction
(c) pH
(d) Pressure

Karnataka CET-2018

Ans. (b) : In the following graph y-axis represent the velocity of reaction and the substrate-enzyme activity is represented on x- axis. Enzyme activity represented by Michaelis Menten equation.

283. Which one of the following statement is correct with reference to enzymes?

(a) Apoenzyme = Holoenzyme + Coenzyme
(b) Holoenzyme = Apoenzyme + Coenzyme
(c) Coenzyme = Apoenzyme + Holoenzyme
(d) Holoenzyme = Coenzyme + Cofactor

NEET-2017

Ans. (b) : Holoenzyme or conjugate enzymes consist of a protein as well as non protein part essential for the activity.

- The protein part of the holoenzyme is known as apoenzyme which is inactive.
- The non-protein part is called a coenzyme and is necessary for the catalytic function of the enzymes. So, holoenzyme is an active enzyme-cofactor complex i.e. an apoenzyme attached to a coenzyme.
- Co-enzymes are tightly bound to the enzyme they are referred to as a prosthetic group.

@apna_pdf

284. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme?

(a) Fungi – Chitinase (b) Bacteria–Lysozyme
(c) Plant cells–Cellulase (d) Algae–Methylase

NEET-2013

Ans. (d) : Enzymes are proteins that help speed up metabolism, or the chemical reactions in our bodies. They build some substances and break other down. All living things have enzymes. Our bodies naturally produce enzymes.

285. Jacob and Monod named some enzymes as allosteric whose activity is regulated by

(a) end product (b) substrate
(c) by product (d) coenzyme

JIPMER-2014

Ans. (a) : Jacob and Monod named some enzymes as allosteric whose activity is regulated by end product. Allosteric enzyme have one or more allosteric sites**.** The term allosteric has been introduced by Jacob and Monod to denote an enzyme site different from the active site. These enzyme have one or more allosteric site that are binding site different from enzyme active site.

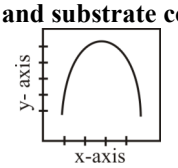
286. Three of the following statements about enzymes are correct and one is wrong which one is wrong

(a) Most enzymes are proteins but some are lipids
(b) Enzymes require optimum pH for maximal activity
(c) Enzymes are denatured at high temperatures but in certain exceptional organisms they are effective even at tempreatures 80°- 90°C
(d) Enzymes are highly specific

AIPMT (Mains)-2010
Neet Karnataka - 2013

Ans. (a) : Enzymes are biocatalysts and they catalyze the biochemical reaction both in vivo as well in vitro. They are highly specific to its substrate and high great catalytic power i.e. they enhance the rate of reaction tremendously without being change. All enzyme are proteins with some exception of some small group of catalytic RNA molecules called ribozymes.

287. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration)



What do the two axises (x and y) represent ?

	x-axis	y-axis
(a)	enzymatic activity	temperature
(b)	enzymatic activity	pH
(c)	temperature	enzyme activity
(d)	substrate concentration	enzymatic activity

AIPMT (Screening)-2011

Ans. (c) : Enzymes are generally proteins that act as biological catalysts by accelerating chemical reactions. They generally function in a narrow range of temperature and pH. Each enzyme shows its highest activity at a particular temperature and pH called the optimum temperature and optimum pH. Activity declines both below and above the optimum values. X axis always represents temperature or pH. Y axis represents enzyme activity.

288. Assertion: Enzyme have active sites and substrate reactive site on their surfaces respectively.
Reason: Active and reactive sites push the enzyme and substrate molecules away from each other.
(A) If both (A) and (R) are true and the (R) is correct explanation of the (A).
(B) If both (A) and (R) are true but the (R) is not correct explanation of the (A).
(C) If the (A) is true but the (R) is false.
(D) If both the (A) and (R) are false.
(E) If (A) is false, but (R) is true.

(a) A (b) B
(c) C (d) D
(e) E

AIIMS-1999

Ans. (c) : The region of the enzyme surface which combines with the substrate to form the enzyme substrate complex and at which the transformation of the substrate products occurs is called the active site of the enzyme.

289. Who coined the term zymase?

(a) Pasteur (b) Buchner
(c) Kuhne (d) Summer

AIIMS-1999

Ans. (b) : Zymase was first isolated from the yeast cell in 1897 by a German chemist named Eduard Buchner. He got Noble prize in 1907 in chemistry. He proved that yeast extract formed sugary material. He concluded that was something present in yeast cell which is responsible for fermentation that was zymase.

290. Which of the following is associated with synthesis of enzymes?

(a) Translation (b) Replication
(c) Transduction (d) Transformation

BVP-2005

Ans. (a) : Translation is associated with the synthesis of enzymes. It is the process where the information encoded in an mRNA molecule is used to assemble a specific amino acid sequence resulting in the formation of a functional protein.

291. Which one of the following statements is true for the enzymes?

(a) All enzymes are protein
(b) All proteins are enzymes
(c) All enzymes are not protein
(d) All enzymes are vitamins

BVP-2002

Ans. (a) : All enzymes are protein in nature and their synthesis involves the linking together of amino acids acting as catalyst in specific biochemical reaction. They are naturally produced in the body.

@apna_pdf

292. Biological catalyst is:
(a) an enzyme (b) an amino acid
(c) an amino sugar (d) an antacid

BVP-2001

Ans. (a) : Enzymes are biocatalysts and they catalyze the biochemical reaction both in vivo as well in vitro. They are highly specific to its substrate and high great catalytic power i.e. they enhance the rate of reaction tremendously without being change. All enzyme are proteins with some exception of some small group of catalytic RNA molecules called ribozymes.

293. Enzymes with two sites are called
(a) allosteric enzyme (b) apoenzyme
(c) conjugate enzyme (d) holoenzyme

AIIMS-1995

Ans. (a) : Allosteric enzyme are those enzymes possess additional sites, known as allosteric sites besides the active site. They are unique places on the enzyme molecules, allosteric enzymes have one or more allosteric site.

294. Transition state structure of the substrate formed during an enzymatic reaction is :
(a) permanent and stable
(b) transient but stable
(c) permanent but unstable
(d) transient and unstable

NEET-2013

Ans. (d) : Transition state structure of the substrate formed during an enzymatic reaction is transient and unstable. Transition state is unstable and transient the transition state have a activation energy which is high when energy is absent but activation enzyme become low when enzyme present so enzyme move fast reaction.
The transitions state is the intermediary state of the reaction, when the molecule is neither a substrate or product.

295. In which one of the following sets of three items each belong to the category mentioned against them?
(a) Lysine, glycine, thymine – amino acids
(b) Myosin, oxytocin and gastrin – hormones
(c) Rennin, helicase and hyaluronidase – enzyme
(d) Optic nerve, oculomotor, vagus – sensory nerves

AIIMS-2006

Ans. (c) : Rennin, helicase, hyaluronidase are all enzymes.
- **Rennin (Chymosin),** secreted by the stomach is responsible for clotting of milk. It acts on a soluble milk protein (caseinogens) to converts it into the insoluble form casein.
- **Helicase** unwinds double stranded helical DNA during replication.
- **Hyaluronidase** is able to digest hyaluronic acid (major glycosaminoglycan) and is therefore important in modulating the removal of cell matrix in order to facilitate all movement or tissue organization.

296. Curdling of milk in small intestine occurs due to the action of
(a) Rennin (b) Erypsine
(c) Trypsin (d) Chymotrypsin.

AIIMS-2002

Ans. (d) : Curdling of milk in small intestine is due to the presence of chymotrypsin. In babies, curdling of milk occurs in stomach due to the presence of enzyme rennin but **in adults curdling occurs in small intestine by Chymotrypsin enzyme** which coagulate milk protein casein into curd.

297. An organic substance bound to an enzyme and essential for its activity is called
(a) coenzyme (b) holoenzyme
(c) apoenzyme (d) isoenzyme

AFMC-2008

Ans. (a) : An organic Substance bound to an enzyme and essential for it activity is called a coenzyme.
It is a non-protein factor of the enzyme and can be easily separated from the enzymes.
Ex:- NAD^+, $NADP^+$

298. The enzyme which converts maltose into glucose is
(a) diastase (b) hydrogenase
(c) invertase (d) maltase

Punjab MET-2007

Ans. (d) : Maltase is the enzyme that breakdown maltose into glucose by breaking the bond between the two glucose molecules in maltose. This allows the glucose to be absorbed into the body for energy.

$$\text{Maltose} \xrightarrow{\text{Maltase}} \text{Glucose}$$

299. The enzyme which converts corn starch into fructose rich corn syrup is
(a) amylases (b) glucoamylases
(c) glucoisomerases (d) all of the above

Punjab MET-2007

Ans. (d) : The enzyme which converts corn starch into fructose rich corn syrup is amylases, glucoamylases and glucoisomerases. It application in flavour soft drink, and sweets biscuits and cakes.

300. In plants, enzymes are present :
(a) Only in leaves
(b) Only in flowers
(c) Only in storage organs
(d) In all the living cells of plant body

JIPMER-2002

Ans. (d) : Enzymes are present in all the living cells of plant body because no life process can be carried out successfully in the lack of enzyme.

301. Enzyme 'renin' is secreted by
(a) Cells of stomach
(b) Cells of intestine
(c) The cortical cells of kidney
(d) The cells of juxtaglomerular apparatus of kidney

CG PMT-2005

Ans. (d) : Enzyme renin is secreted by the cells of the juxtaglomerular apparatus of kidney. When systolic blood pressure falls or kidneys sense that volume depletes kidney, release renin into blood stream. Renin is also known as angio-tensinogenase.

@apna_pdf

302. Mo is a part of this enzyme:
(a) Reverse transcriptase
(b) Restriction endonuclease
(c) Hexokinase
(d) Nitrogenase

BCECE-2015

Ans. (d) : Nitrogenase enzymes are found in N_2 fixing microbes that is capable of reducing nitrogen, the enzyme require to fix the nitrogen is Mo-Fe protein. It converts atmospheric nitrogen into ammonia.

303. Substrate of an enzyme is
(a) The reactant of the reaction catalysed by the enzyme
(b) Competitive inhibitor of the enzyme
(c) Uncompetitive inhibitor of the enzyme
(d) Prosthetic group of the enzyme

AMU-2014

Ans. (a) : Substrate of an enzyme is the reactant of the reaction catalysed by the enzyme. A substrate is a molecule that an enzyme reacts with. It is basically starting material for enzymatic chemical reaction.

304. The inorganic catalyst attached to enzymes is called:
(a) Activator (b) Lysozyme
(c) Apoenzyme (d) Inhibitor

Rajasthan PMT-2001

Ans. (a) : An activator attached to enzymes which is an inorganic catalyst. These activators are bind to the enzyme and increase its activity.

305. Metabolic processes in living organisms are catalyzed by :
(a) hormones (b) enzymes
(c) lipids (d) amino acids

Rajasthan PMT-2001

Ans. (b) : Metabolic processes in living organism are catalyzed by enzymes.
Enzymes are biological catalyst and they catalyze the biochemical reactions. All enzymes are proteins with exception of some small group of catalytic RNA molecules called ribozymes.

306. K_m is
(a) Product (b) Enzyme
(c) Constant (d) Unit

WB JEE-2014

Ans. (c) : Michaelis- Menten kinetics is one of the best known and simplest models of enzyme kinetics. K_m act as a Michaelis-Menten constant in the equation-

$$V_0 = \frac{V_{max}[S]}{K_m[S]}$$

where, K_m is called Michaelis constant, V_0 is initial velocity, V_{max} is maximum velocity of reaction, and [S] is substrate concentration.

307. The enzyme, which combines with non-protein part to from a functional enzyme known as
(a) Co-enzyme (b) Holoenzyme
(c) Apoenzyme (d) Prosthetic group

BVP-2007

Ans. (b) : Holoenzyme consist of a protein part and non-protein part, protein part is called apoenzyme and non-protein part is called co-factor. The complete biologically active conjugated enzyme is called Holoenzyme.

308. Bromelain is an enzyme extracted from
(a) Yeast (b) Ficus
(c) Pineapple (d) Papaya

CMC Vellore-2011

Ans. (c) : Bromelain is a protein digestive enzymes obtained commercially from fruit or stem of pineapple which is belongs to the family Bromlaceae.

309. The enzyme peptidyl transferase of prokaryotes resides in
(a) 50 S ribosome (b) 30 S ribosome
(c) 40 S ribosome (d) 60 S ribosome

WB JEE-2015

Ans. (a) : The enzyme peptidyl transferase of prokaryotes resides in large ribosomal subunit 50 S.
It has a fundamental role in protein synthesis. It forms peptide bond between adjacent amino acid during protein synthesis with the help of tRNA.

310. Which one of the following enzymes is responsible for the conversion of norepinephrine to epinephrine?
(a) Catecholamine-O-methyltransferase
(b) Phenylalanine-N-methyltransferase
(c) DOPA decarboxylase
(d) Monoamine oxidase

WB JEE-2015

Ans. (b) : The enzyme **phenylalanine-N-methyl transferase** found in adrenal medulla of kidney that converts nor-epinephrine to epi-nephrine and these hormones are responsible for the stress responses.

311. Hydrolytic enzymes which act at low pH are called as
(a) proteases (b) α-amylases
(c) hydrolases (d) peroxidase

AIPMT-2002
Rajasthan PMT-2007

Ans. (a) : Protease is an enzyme that contains hydrolytic property. It acts in low pH for digesting protein in stomach.

312. Some of the enzymes, which are associated in converting fats into carbohydrates are present in
(a) microsomes (b) liposomes
(c) Golgi bodies (d) glyoxysomes

Punjab MET-2010

Ans. (d) : Glyoxysomes are specialized peroxisomes found in fungi and other higher plant (specially in fat storage tissues in germinating seeds). When oil filled seeds germinate, then the number and activity of glyoxysomes also increase. Glyoxysomes contain all the enzymes necessary for the fatty acid- oxidation, glyoxylate cycle and glyconeogenesis.

@apna_pdf

313. Which of the following statements regarding enzyme inhibition is correct –

(a) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein

(b) Non-competitive inhibitors often bind to the enzyme irreversibly

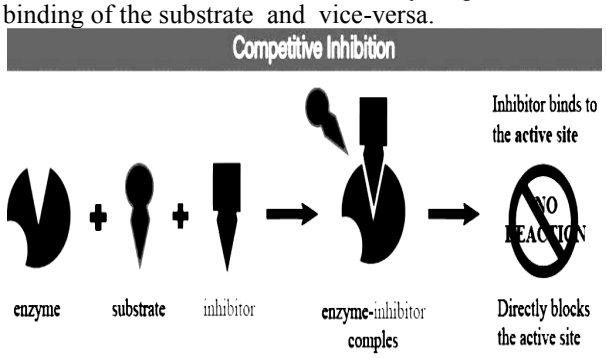
(c) Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme

(d) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate

AIPMT-2005

Ans. (c) : Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme. When the binding of the chemical shuts off enzyme activity, the process is called inhibition, and the chemical is called an inhibitor. When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme it is known as competitive inhibitor.

Competitive inhibition occurs when the binding of the inhibitor to the active site on the enzyme prevents the binding of the substrate and vice-versa.



L. Factor Affecting Enzyme Activity

314. The chylomicrons are broken down to fatty acids and glycerol by the action of the enzyme

(a) Steapsin (b) Lipoprotein lipase

(c) Intestinal lipase (d) Gastric lipase

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : The chylomicrons are broken down to fatty acids and glycerol by the action of the enzyme Lipoprotein lipase. This enzyme is present on the surface of blood vessels in various issue and facilitates the release of fats from chylomicrons.

315. Identify A and B in the following equation Casein $\xrightarrow[Ca^{++}]{A}$ Calcium paracaseinate $\xrightarrow{B}$ Peptones

(a) A. Renin B. Chymotrypsin

(b) A. Rennin B. Trypsin

(c) Ptyalin B. Pepsin

(d) A. Rennin B. Pepsin

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : Casein $\xrightarrow[Ca^{2+}]{Rennin}$ Calcium paracaseinate $\xrightarrow{Pepsin}$ peptones.

The reaction represents the breakdown of casein, a milk protein, into calcium paracaseinate and peptones due to the action of the enzymes rennin and pepsin, respectively.

316. The essential component of many co-enzymes are

(a) Vitamins (b) Metal ions

(c) Hormones (d) Lipids

TS EAMCET-11.05.2023, Shift-II

Ans. (a) : Coenzymes are cofactors that enhance enzyme activity by helping in chemical transformation. Many of these coenzymes are derived from essential organic compounds called vitamins.

317. 'Transketolase'' catalyses the following reaction

(a) G-3-P+DHAP and Fructose 6P + G-3 P Reactions

(b) Fructose-6 P + G-3-P and Sedoheptulose –7-P Reactions

(c) G-3-P + DHAP and Erythrose -4-P + DHAP Reactions

(d) Erythrose-4-P + DHAP and Sedoheptulose – 7-P + G-3 Reactions

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : The enzyme "Transketolase" catalyzes the reaction Fructose-6P + G–3–P and sedoheptulase–7–P.

This reaction involves the transfer of a two-carbon fragment from one sugar phosphate molecule to another, contributing to the inter-conversion of sugar phosphates in the pentose-phosphate pathway.

318. Enzyme catalyzed reactions can be inhibited by

(a) Zn^{2+} (b) Mg^{2+}

(c) Hg^{2+} (d) Cu^{2+}

Uttarakhand PMT-2011

Ans. (c) : Mercury inhibits glucose-6- phosphatase, enzyme is involved in production of glucose in cells. It also inhibits many enzymes involved in digestion of food molecule.

319. An example of non-competitive inhibition is

(a) The inhibition of succinic dehydrogenase by malonate

(b) Cyanide action on cytochrome oxidase

(c) Sulpha drug on folic acid synthesizing bacteria

(d) The inhibition of hexokinase by glucose 6-phosphate

(e) Reaction of succinic dehydrogenase

Kerala PMT-2009

Ans. (b) : Non-competitive inhibition is a type of inhibition where, inhibitor has no structural similarity with substrate and bind with the enzyme at different site other than the active site.

Example of non competitive inhibition is cyanide action on cytochrome oxidase..

320. Which is a typical example of 'feedback inhibition?

(a) Cyanide and cytochrome reaction

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(b) Sulpha drugs and folic acid synthesizer bacteria
(c) Allosteric inhibition of hexokinase by glucose 6-phosphate
(d) Reaction between succinic dehydrogenase and succinic acid

AIPMT-1996

Ans. (c) : Allosteric inhibition of hexokinase by glucose 6-phosphate. It is a typical example of feedback inhibition. In glycolysis, the glucose, changes to glucose-6-phosphate in presence of hexokinase. When amount of glucose-6-phosphate exceeds it deactivate hexokinase.

321. Choose the wrong statement among the following
(a) Trypsinogen is activated by enterokinase
(b) The optimum pH for salivary amylase activity is 8.9
(c) Rennin helps in the digestion of milk proteins
(d) Goblet cells secrete mucous
(e) Submucosal glands of the intestine are also known as Brunner's glands

Kerala PMT-2014

Ans. (b) : The optimum pH for salivary amylase range is between 6.7 to 7
Trypsinogen is activated by enterokinase and forms an active enzyme 'Trypsin'.
Goblet cells are mucus secreting unicellular glands.
Rennin is a proteolytic enzyme found in gastric juice of infants which help in the digestion of milk protein.

M. Nomenclature of Enzyme and its Classification

322. Which of the following enzymes belong to class 6 Ligases ?
(a) Glutamine synthetase
(b) Hexokinase
(c) Malate dehydrogenase
(d) Arginosuccinase

TS EAMCET 10.05.2023 Shift-I

Ans. (a) : Glutamine synthetase belongs to class 6 ligases which catalyzes the formation of glutamine by joining glutamate and ammonia, using ATP as an energy source.

323. Haem group associated with the enzyme catalase is an example of
(a) Apoenzyme (b) Prosthetic group
(c) Co-enzyme (d) Co-factor

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : The haem group is a prosthetic group that is found in the enzyme catalase. It is essential for the activity of catalase, which is an enzyme that breaks down hydrogen peroxide.

324. Enzymes are mainly classified into _____ groups
(a) 5 (b) 6
(c) 7 (d) 8

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : Enzymes are mainly classified into 6 class-

Class	Nature of reaction
1. Oxidoreductases	Oxidation Reduction
2. Transferases	Functional group transfer
3. Hydrolases	Cleavage of chemical bond
4. Isomerases	Isomerization of substrate into structural isomers
5. Ligases	Joining of two molecule by forming new covalent bond.
6. Lyases	Non Hydrolytic cleavage of chemical bond.

325. Choose the correct pair from the following
(a) Polymerases – Break the DNA into fragments
(b) Nucleases – Separate the two strands of DNA
(c) Exonucleases – Make cuts at specific positions within DNA
(d) Ligases – Join the two DNA molecules

NEET-2020 Phase-I

Ans. (d) : DNA Ligase is an essential biological enzyme because it fixes phosphodiester links that have broken as a result of DNA replication or recombination.
In genetic engineering, it is used to close gaps in the sugar- phosphate chains that develop as a result of connecting DNA molecules.

326. Assertion (A) : Glucose + ATP $\xrightarrow{\text{Hexokinase}}$ Glucose – 6 – Phosphate + ADP
Reason (R) : Enzyme which catalyzes this reaction belongs to enzyme class "Transferase".
The correct answer is:
(a) Both (A) and (R) are true, (R) is the correct explanation of (A)
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-08.05.2019 Shift-I

Ans. (a) : Hexoknase is the initial enzyme of glycolysis, catalyzing the phosphorylation of glucose by ATP to glucose-6-phosphate and ADP. Basically hexokinase is protein and it is classified under enzyme transferases.

327. Which one of the following enzymes acts as the molecular glue in the cell?
(a) Lipase (b) Ligase
(c) Polymerase (d) Exopeptidase

Tripura JEE-2017

Ans. (b) : Ligase are known as molecular glues because DNA ligase is used to joint two fragments of DNA to seal the gaps between them. In the process of ligation only matching DNA fragments with complementary ends can be joined.

@apna_pdf

328. Arginosuccinase is an example to

(a) Hydrolase (b) Ligase
(c) Lyase (d) Oxido-reductase

AP EAMCET-2013

Ans. (c) : Argininonsuccinate lyase is the full name of the enzyme called as argininosuccinase or ASL. The reversible breakdown of argininosuccinate (ASA) into arginine amino acid and fumaric acid is catalysed by this enzyme. It is the fourth urea cycle enzyme and is essential for the generation of urea in ureotelic species.

329. Which of the following acts as an isomerase enzyme?

(a) Phosphoglucomutase
(b) Fumerases
(c) Transphosphorylases
(d) Nitrate reductase

BCECE-2015

Ans. (a) : The enzyme phosphoglucomutase (phosphotransferases) belongs to the group of isomerases, which transfer phosphate groups within a molecule.

330. In the nomenclature of enzyme restriction endonuclease the Roman numeral indicates

(a) Number of times it is used
(b) The order of discovery from source
(c) Number of cuts on DNA
(d) Number of recombinants formed

MHT CET-2015

Ans. (b) : The roman number typically denotes the sequence of discovery of restriction enzymes in a specific strain.

331. Choose the type of enzyme involved in the following reaction :

$$S\text{-}G + S' \rightarrow S + S'\text{-}G$$

(a) Dehydrogenase (b) Transferase
(c) Hydrolase (d) Lyase
(e) Isomerase

Kerala PMT-2011

Ans. (b) : Transferase is the enzymes involves in transferring of specific functional group like glycosyl or methyl group from one molecule to another molecule.

N. Co-Factor

332. Match the following lists:

	List-I		List-II		List-III
A	NADP	I	Prosthetic group	i	Enzyme's globular structure changes
B	Peroxidase	II	Coenzyme	ii	Bonds with enzyme and substrate
C	Cu	III	Cofactor	iii	Transient association with coenzyme
D	Zn	IV	Non competitive inhibitor	iv	Tightly bound to apoenzyme

The correct match is:

	A	B	C	D
(a)	II, iii	I, iv	IV, i	III, ii
(b)	III, iii	II, ii	IV, iv	I, i
(c)	II, iii	I, iv	III, ii	IV, i
(d)	III, ii	I, iv	IV, i	II, iii

TS EAMCET-31.07.2022 Shift-I2

Ans. (a) :

	List-I		List-II		List-III
A	NADP	II	Coenzyme	iii	Transient association with coenzyme
B	Peroxidase	I	Prosthetic group	iv	Tightly bound to apoenzyme
C	Cu	IV	Non competitive inhibitor	i	Enzyme's globular structure changes
D	Zn	III	Cofactor	ii	Bonds with enzyme and substrate

333. Consider the following statement :

(A) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.

(B) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme.

Select the correct option.

(a) (A) is true but (B) is false.
(b) Both (A) and (B) are false
(c) (A) is false but (B) is true.
(d) Both (A) and (B) are true.

NEET-2019

Ans. (a) :

(i) A-coenzyme – A non-protein organic substance which is dialyzable, thermostable and loosely attached to the protein part.

(ii) Prosthetic group – An organic substance which is dialyzable and thermostable which is firmly attached to the protein apoenzyme portion.

334. Match the column I and Column II:

Column-I	Column-II
(i) MoO_2^{+2}	**(A) Alcoholic dehydrogenase**
(ii) Mg^{+2}	**(B) Nitrogenase**
(iii) Zn^{+2}	**(C) Catalase**
(iv) Fe^{+3}	**(D) PEP carboxylase**

(a) (i)–B, (ii) –D, (iii) –C, (iv) –A
(b) (i) –B, (ii) –A, (iii) –D, (iv) –C
(c) (i) –D, (ii) –B, (iii) –A, (iv) –C
(d) (i) –B, (ii) –D, (iii) –A, (iv) –C

AIIMS-26.05.2018 Shift-I

Ans. (d):

(i) MoO_2^{+2} (B) Nitrogenase
(ii) Mg^{+2} (D) PEP carboxylase
(iii) Zn^{+2} (A) Alcoholic dehydrogenase.
(iv) Fe^{+3} (C) Catalase

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335. Enzymes used for isolation of DNA from Bacterial cell

(I) Lysozyme **(II) Cellulose**
(III) Chitinase **(IV) Protease**
(V) Ribonuclease **(VI) Endonuclease**

Options:

(a) I,IV,V (b) II, V, VI
(c) I, II, IV, VI (d) I, III, IV, V

AP EAMCET-28.04.2017 Shift-II

Ans. (a) : In the first step isolation of DNA from bacterial cell we have to break the cell open to release DNA, protein etc. This is achieved by the enzyme Lysozyme.
→ Protein can be removed by the treatment of protease.
→ RNA can be removed with the treatment of Ribonuclease.

336. Study the following lists.

	List I		List II
(A)	Oxidative decarboxylation	(i)	Carbonic anhydrase
(B)	Competitive inhibition	(ii)	Malic enzyme
(C)	Metal ion as Cofactor	(iii)	Pepsin
(D)	Organic molecule as cofactor	(iv)	Peroxidase
		(iv)	Succinic dehydrogenase

The correct match is :

	A	B	C	D
(a)	2	1	5	4
(b)	5	2	3	1
(c)	2	5	1	4
(d)	5	1	2	4

AP EAMCET-2010

Ans. (c) : List I	**List II**
Oxidative decarboxylation	Malic enzyme – It catalyses the reversible oxidative decarboxylation of malate to pyruvate, CO_2 and NADPH in the presence of divalent metal ion.
Competitive inhibitor	Succinic dehydrogenase – It catalyses the oxidation of succinate into fumarate.
Metal ion as cofactor	Carbonic anhydrase – It catalyses the inter conversion of carbon dioxide and carbonic acid.
Organic molecule as cofactor	Peroxidase – It catalyse the oxidation of substrate by hydrogen peroxide (H_2O_2) or an organic peroxide.

337. FAD coenzyme is made from :

(a) pantothenic acid
(b) thymine
(c) riboflavin
(d) folic acid

Haryana PMT-2001

Ans. (c) : FAD (Flavin adenine dinucleotide) Riboflavin is a primarily found as an integral component of co-enzyme FAD derived from riboflavin or vitamin E.
• Riboflavin is water soluble vitamin or vitamin B_2 .

338. Which statement regarding coenzyme is incorrect ?

(a) Every coenzyme is a cofactor and every cofactor is a coenzyme
(b) Every coenzyme is a cofactor but every cofactor is not a coenzyme
(c) Most of the coenzymes are nucleotides and are composed of vitamins
(d) Coenzymes are the active constituents of enzymes

Punjab MET-2005

Ans. (a) : Cofactor can be organic molecules or metal.
Co-factor are non protein constituents of enzyme, which are bound to the enzyme to make the enzyme catalytically active.
- There may be 3 kinds of cofactor- prosthetic group, coenzymes and metal ions.
- Prosthetic groups are organic compounds that are tightly bound to the apoenzyme.
- Coenzymes are also organic compounds but their association with the apoenzyme is only transient.
- The most of components of coenzyme are nucleotides and vitamins.

Thus every co-enzymes are co-factors but every co-factor can not be co-enzyme.

339. Enzyme ATPase is required for muscle contraction. The location of that enzyme is

(a) Actin
(b) Troponin
(c) Actinin Phlebotomus
(d) Myosin

Manipal-2014

Ans. (d) : Enzyme ATPase is required for muscle contraction. The location of that enzyme is myosin. It cross bridges the heads during muscle contraction. It consist an action binding protein as well as an ATPase, which is activated by Ca^{2+} and Mg^{2+} ons.

340. Which one of the following enzymes initiates protein digestion?

(a) Amino peptidase
(b) Carboxy peptidase
(c) Trypsin
(d) Pepsin

CG PMT-2004

Ans. (d) : Pepsin initiates protein digestion in stomach. Pepsin breaks the polypeptide bond of protein into small fragments.

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10 CELL CYCLE AND CELL DIVISION

A. Cell Cycle

1. Polyploidy can be induced by the application of

(a) auxin (b) kinetin
(c) colchicine (d) ethylene

JIPMER- 2012, 2005 / BVP-2009
CMC Vellore-2008 / BHU PMT (Mains)-2006
AMU-2006 / BVP-2006, 2001
JCECE-2005 / Haryana PMT-2007, 2005
Punjab MET-2004 / BHU PMT-2003
JIPMER-2001 / AIIMS-2000 / Manipal-2000

Ans. (c) : Colchicine is a chemical that arrests the spindle fibre formation during cell division. As a result of it chromosome do not separate and ploidy level of the cell increases.

Auxin:- Auxin is a plant hormone that promotes cell division delays senescence, prevent abscission and induces parthenocarpy.

Ethylene:- It is a gaseous plant phytohormone. Ethylene is mainly concerned with maturation and ripening of fruits.

Kinetin:- It is a cytokinin plant hormone that promotes cell division, delays senescence, promotes lateral growth.

2. Attachment of spindle fibers to kinetochores of chromosomes becomes evident in

(a) Metaphase (b) Anaphase
(c) Telophase (d) Prophase

NEET-2020 Phase-II /NEET-2016 Phase-I
NEET (Karnataka)-2013 / JIPMER-2012
AIPMT (Mains)-2011

Ans. (a) : In cell cycle, during metaphase stage spindle fibres originating from the chromosomes attaches to the kinetochore of the chromosomes.

• Kinetochore is a disc shaped structure at the surface of centromere through which the sister chromatids are held together, During metaphase the chromosome arrange themselves at equator on metaphasic plate due to this arrangement, the attachment of spindle fibers to kinetochore is clearly visible.

3. A bacterium divides after every 35 min if a culture containing 10^5 cells per mL is grown, then cell concentration per mL after 175 min will be

(a) 175×10^5 (b) 125×10^5
(c) 48×10^5 (d) 32×10^5

UP CPMT-2012 / BHU PMT (Screening)-2008
CG PMT-2008 / BVP-2007
BHU PMT-2004

Ans. (d) : A bacterium divides every 35 minutes.
At zero minutes the culture contains 10^5 cell/m after 35 minutes the culture will contain 2×10^5 cell/m that is –
After 175 minutes, 5 generation of the number of cell will be $2^5 \times 10^5$ cell/m.
That is equal to 32×10^5 cell/m

4. Cell that do not divide further due to the following changes in cell cycle

(a) Exit G_1 and enter S phase of cell cycle
(b) Exit G_0 and enter G_1 phase of cell cycle
(c) Exit G_1 and enter G_0 phase of cell cycle
(d) Exit interphase and enter M phase

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : G_0 is a non-dividing phase of the cell cycle. Cells in G_0 are not dividing, but they are still alive and metabolically active. Cells can enter G_0 from any phase of the cell cycle, and they can exit G_0 and return to the cell cycle. So, the cell that does not divide further will exit G_1 and enter G_0 phase of the cell cycle.

5. Given below are two statements:

Statement I : During G_0 phase of cell cycle, the cell is metabolically inactive.

Statement II : The centrosome undergoes duplication during S phase of interphase.

In the light of the above statements, choose the most appropriate answer from the options given below:

(a) Statement I is incorrect but Statement II is correct.
(b) Both Statement I and Statement II are correct.
(c) Both Statement I and Statement II are incorrect.
(d) Statement I is correct but Statement II is incorrect.

NEET (UG) 07.05.2023

Ans. (a) : Cells in this stage remain metabolically active but not longer proliferate unless called on to do so depending on the requirement of the organism.

• The cell cycle is the process by which a cell duplicates its genome, synthesizes other cell parts and eventually splits into two daughter cells.

6. Choose the incorrect statements among the following.

(A) Cells of the lining of the gut are replaced by mitotic division constantly
(B) Formation of liquid endosperm takes place, if karyokinesis is not followed by cytokinesis
(C) In telophase, the chromosomes reach the poles and start condense to form the chromatic network
(D) In quiescent stage, the cell is metabolically inactive

Options:

(a) A, B (b) B, C
(c) C, D (d) A, D

TS EAMCET-09.08.2021 Shift-I

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Ans. (c) :
Formation of liquid endosperm in coconut takes place because karyokinesis is not followed by cytokinesis. During the early development of liquid endosperm in coconuts.

7. Meiocytes are ____
(a) Gametes (b) Gamete mother cells
(c) Haploid gametes (d) Diploid gametes

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : Meiocyte differentiate into gamete through the process of meiosis. The diploid meiocyte divides into four genetically different haploid gametes. Hence, they are called as "gamete mother cell".

8. Amitosis is the usual process of cell division
(a) Meristematic cells
(b) Prokaryotic cells
(c) Eukaryotic cells
(d) Spore mother cells

HP CET-2018
BCECE-2011

Ans. (b) : Amitosis is a type of direct cell division in which the nucleus divides into two daughter nuclei without chromosomal differentiation or the formation a spindle apparatus.

9. Cytokinin helps in
(a) Cell division (b) Cell elongation
(c) Apical dominance (d) All of these

UP CPMT-2010

Ans. (d) : The cytokinin helps in cell division. Cytokinins affect many aspects of plant growth and development including cell division, shoot Initiation and growth, leaf senescence, apical dominance and embryonic development.
• Cytokinin discovered by Folke Skoog and colleagues (1950).
• Apical dominance is the phenomenon in plants where a main shoot dominates and inhibits the outer growth of other shoots

10. Anticlinal or radial division mean division in :
(a) Transverse plane
(b) At right angle to outer wall
(c) Plane parallel to outer wall
(d) At any plane

AFMC -2011

Ans. (b) : Anticlinal or radial division means division in at right angle to outer wall.
"The process by which new cells files are added to the cambial layer is called Anticlinal division".
• Anticlinal cell division found in protoderm.

11. Chromosome number is
(a) Fixed for a species
(b) Fixed for an ecosystem
(c) Fixed for a community
(d) Fixed for a biosphere

CG PMT-2007

Ans. (a) : "Van Beneden" 1887 discovered that each species has a fixed number of chromosomes in their body. In plants, highest number of chromosome found in *Ophioglossum reticulatum* (2n = 1262).

12. Congression is a phenomenon of
(a) movement of sister chromatids towards the poles
(b) pairing of homologous chromosomes
(c) separation of paired chromosomes
(d) bringing the chromosomes on equator of spindle apparatus

AMU-2007

Ans. (d) : Congression is a phenomenon of bringing the chromosome on equator of spindle apparatus.
• Congression means the act or action of coming together.
• This process takes 15-20 min and result in the formation of the metaphase plate.

13. Choose the chemical used in artificial polyploidy:
(a) polyethylene glycol
(b) sodium alginate
(c) acenaphthene
(d) sodium hypochloride

AP EAMCET-2003

Ans. (c) : Acenaphthene chemical used in artificial polyploidy. Chemical formula is $C_{12}H_{10}$
• Polyethylene glycol is used management and treatment of constipation.
• Sodium alginate is used in thickening agent emulsifier, texture improver.
• Sodium hydrochloride used in bleach & disinfecting agent.

14. Best material for demonstrating streaming movements of protoplasm within living cells is
(a) onion peelings
(b) staminal hair of tradescantia
(c) sensitive plant
(d) pith cells

Haryana PMT-2007

Ans. (b) : Best material for demonstrating streaming movements of protoplasm with in living cell is staminal hairs of Tradescantia.
-Tradescantia commonly known as spiderwort in family commelinaceae.
• Pith parenchyma cell store water in various plants organs
• Pith is a small zone at the center of the stem.

15. Meiosis in Dryopteris takes place during
(a) gamete formation (b) spore germination
(c) zygote formation (d) spore formation

AMU-2006

Ans. (d) : In Dryopteris the gametophytes give rise to sporophyte by gametic union and sporophyte give rise to gametophytes by forming haploid spores after meiosis.

$$\text{Gametophyte(n)} \xrightarrow{\text{Gamitic union}} \text{Sporophyte(2n)}$$

$$\text{Sporophyte(2n)} \xrightarrow{\text{meiosis}} \text{Gametophyte(n)}$$

• Dryopteris is a pteridophyte plant commonly called wood ferns, male ferns or bucker ferns is a fern genus in the family Dryopteridaceae.

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16. Yeast cell can progress through the cell cycle in about

(a) 30 min (b) 60 min
(c) 90 min (d) 120 min

AMU-2012

Ans. (c) : Yeast cell can progress through the cell cycle in about 90 minute. The duration of the cell cycle depends on the type of cell and external factors such as temperature, oxygen supplies,

17. Which of the following maintain the constant number of chromosomes generation after generation ?

(a) Meiosis (b) Endomitosis
(c) Mitosis (d) Amitosis

MGIMS Wardha-2003

Ans. (a) : Meiosis maintain the constant number of chromosome generation after generation.
-Amitosis is cell division by simple cleavage of the nucleus and division of the cytoplasm without spindle formation or appearance of chromosome
-Endomitosis is one of the processes leading to endopolyploidy in which the stages of mitosis (prophase, metaphase, Anaphase) takes place inside the nuclear membrane and without spindle formation. In mammals endomitosis has been observed in the trophoblast of the placenta of the mouse, rat, rabbit.

18. The anaphase promoting complex is activated by

(a) M cdk cyclin (b) G cdk cyclin
(c) S cdk cyclin (d) Transcription factor

Manipal-2010

Ans. (a) : The anaphase promoting complex is activated by M cdk cyclin. (Mitotic cyclin – dependent kinases)
-M- cdk control entry into mitosis but their role during mitotic progression is less well understood.

- S cdk cyclin that provides domicile essential for enzymatic activity.
- Transcription factors are proteins involved in the process of converting or transcribing DNA into RNA. It is mostly located in the cytoplasm

19. Which is not true for anaphase ?

(a) Golgi body and ER are reformed
(b) Chromosomes move to opposite poles
(c) Spindle poles more farther apart
(d) Centromeres split and chromatids separate
(e) None of the above

CMC Vellore-2010

Ans. (a) : Golgibody and Endoplasmic reticulum are not reformed during Anaphase. They reappear later on after cytokinesis.
In Anaphase the sister chromatids separate from each other and pulled towards opposite ends of the cell.

20. If a bacterial cell divides repeatedly in every minute (one division) and one hour is taken to fill a cup then how much time it will take to fill half cup?

(a) 45 minute (b) 30 minute
(c) 15 minute (d) 59 minute

UP CPMT-2014
AMU -1998

Ans. (d): When a bacterial cell divides every minute and make double its mass and it is taking one hour to fill a cup. Then half of the cup will be filled in 59 minutes, just immediate after that division one cup will be filled.

21. Assertion : Phase of cell division is also known as formative phase.
Reason : In formative phase, new cells are produced from pre-existing cells through meiosis division.

(a) Both Assertion and Reason are true and reason is the correct explanation of the Assertion
(b) Both Assertion and Reason are true but the Reason is not the correct explanation of Assertion
(c) Assertion is true, but Reason is false
(d) Both Assertion and Reason are false

AP EAMCET-2011

Ans. (c) : Phase of cell division is also known as formative phase. In this phase new cells are formed from pre-existing cells through mitotic division. Cell division phase occurs in actively growing regions such as shoot apex and root apex.

22. Beads-on-string like structures of A are seen in B, which further condense to form chromosomes in C stage of cell division.

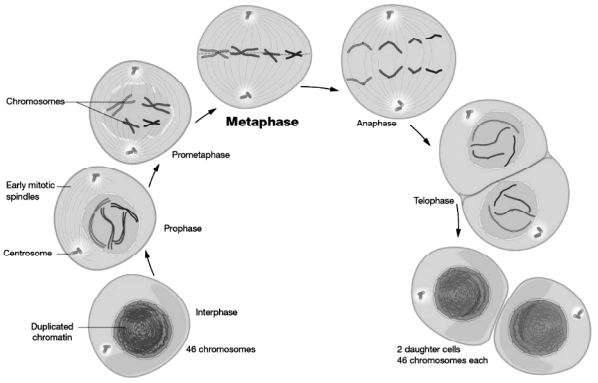
	A	B	C
a.	Chromonema	Chromatin	Metaphase
b.	Chromatin	Chromatid	Metaphase
c.	Chromonema	Chromosome	Anaphase
d.	Chromonema	Chromatid	Anaphase

AIIMS-2012

Ans. (a) :

Chromonema $\xrightarrow{\text{condence}}$ **Chromatin** $\xrightarrow{\text{Condence}}$ **chromosome**
(early prophase) **(metaphase)**

- Chromonema are the coiled mass of threads visible within a nucleus at the beginning of cell division. During metaphase these threads condense into chromatin to arrange at the equator.
- The "beads-on- a- string" structure is seen in electron micro scope of isolated metaphase chromosomes.
- Metaphase is a stage of mitosis in which chromosomes are at their second most condensed and coiled stage.



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23. If a cell has twice as much DNA as in normal functional cell, it means that the cell …….

(a) has completed division
(b) is preparing to divide
(c) has caesed to function
(d) has reached the end of its lifespan

Karnataka CET-2005

Ans. (b) : If a cell has twice as much DNA as in a normal functional cell, it means that the cell is preparing to divide. Three phases occurs in cell division i.e. G_1, S and G_2 phase.
In the 'S' phase of the cell cycle, the amount of DNA doubles in each cell.

24. Guardian angel of genome is

(a) P^{RB} (b) P^{53} Protein
(c) T_4 Cell (d) Interleukin – I

AP EAMCET-2015

Ans. (b) : p^{53} protein has been called the guardian angel of the genome. The name p^{53} is in reference to its apparent molecular mass.
The gene activated by the DNA damage. The p^{53} protein function as activators are several other gene the molecular weight of p^{53} protein has 53.000 dalton. It is tumour suppresin gene and directly involve in DNA repair.

25. Chromosome was discovered by

(a) Hofmeister (b) Muller
(c) Fleming (d) Hammering

MGIMS Wardha-2012

Ans. (c) : Chromosome was discovered by Walther Flemming in 1882.
Chromosome is thread like structure present in the nucleus.
DNA molecules are highly organized and packaged in eukaryotic cell to fit inside the nucleus.

26. Match the item in column I with those in column II and the choose the correct answer.

Column I		Column II	
A.	**Mitosis**	**1.**	**Occurs in diploid cells only**
B.	**Meiosis**	**2.**	**Occurs in both haploid and diploid cells**
		3.	**Daughter and parent cells have same chromosome numbers**
		4.	**Synapsis of homologous chromosomes**

(a) A-1 B-2 (b) A-2 B-3
(c) A-3 B-4 (d) A-4 B-1

WB JEE-2015

Ans. (c) : Mitosis : - Mitosis occurs during the formation of body cells which is called somatic cell division. Since the daughter cell is genetically identical to its mother cell, it is also called all daughter cell by equational division and the parent cells have the same chromosome number.
Mitosis:- Equational division → daughter cell have same number of chromosome as parents.
Meiosis – It is a special type of cell division which reduces the chromosome number resulting in the production of haploid daughter cell synapses of homologous chromosomes.
Meiosis- Reductional division → daughter cells have haploid number of chromosome than parent cell.

B. Phases of Cell Cycle

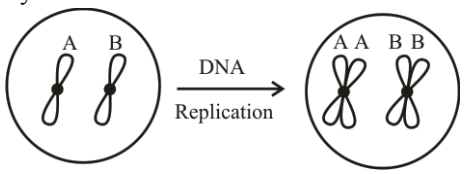
27. DNA replication takes place during

(a) G_1 - phase (b) S - phase
(c) G_2 - phase (d) M - phase

AP EAMCET-25.09.2020 Shift-I
JIPMER-2016, 2012, 2007, 2003
J&K CET-2015 / BVP-2005, 2012
VMMC-2011 / Karnataka CET-2010
WB JEE-2010 Uttarakhand PMT-2009
Rajasthan PMT-2008, 1998 / BCECE-2007
MGIMS Wardha-2005 / Haryana PMT-2004
Manipal-2003 / UP CPMT-2010, 2005, 2001
Punjab MET-1999

Ans. (b) : DNA replication takes place during S-phase.

- S phase is the period of whole DNA synthesis during which the cell replicates its genetic content
- DNA is replicated during s-phase of Interphase
- Cell continues to grow
- The chromosome are duplicated
- The DNA is copied
- Usually lasts about 8 -10 hours.



28. Spindle fibers are made up of

(a) actin with proteins and RNA
(b) cellulose and RNA
(c) tubulin protein and RNA
(d) Both (a) and (b)

VMMC-2012 / WB JEE-2011
Rajasthan PMT-2008, 2007, 2003
JIPMER-2009, 2002 / JCECE-2006
BHU PMT (Screening)-2006
AIPMT-2002 / Manipal-2002
AMU-2011 / BCECE-2010
UP CPMT-2008

Ans. (c) : Spindle fibers are made up of tubulin protein and RNA.
A spindle fiber is composed of a microtubule extending from centrosome. Spindle fibers are cellular structures that serve a function during cell division processes. They are responsible for organizing packages of DNA on opposite end of a cell to ensure that duplicated nuclei can divide into subsequent cell.
-Spindle fibers is a polymer of α and β-tubulin dimer.

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29. Which one of the following precedes re-formation of the nuclear envelope during M-phase of the cell cycle?

(a) Decondensation from chromosomes and reassembly of the nuclear lamina
(b) Transcription from chromosomes and reassembly of the nuclear lamina
(c) Formation of the contractile ring and formation of the phragmoplast
(d) Formation of the contractile ring and transcription from chromosomes

CMC Vellore-2012
Rajasthan PMT-2010
CMC Ludhiana-2009
JCECE-2009 / AFMC-2008

Ans. (a) : Decondensation from chromosomes and reassemble of the nuclear lamina precede reformation of the nuclear envelope during M-phase of the cell cycle. The nuclear membrane which disappear during prophase reappears in telophase. But before its reappearance the nucleus gets reorganised and the decondensation from chromosome and reassamble of the nuclear lamina.

30. In which of the following stage chromosomes are arranged at equatorial plate?

(a) Anaphase (b) Metaphase
(c) Prophase (d) Telophase

BVP-2014 / KVPY SB & SX-2012
VMMC-2012 / BCECE-2010
BHU PMT (Screening)-2009
Uttarakhand PMT-2009
WB JEE-2009 / MGIMS Wardha-2008
DUMET-2005 / UP CPMT-2008, 2003

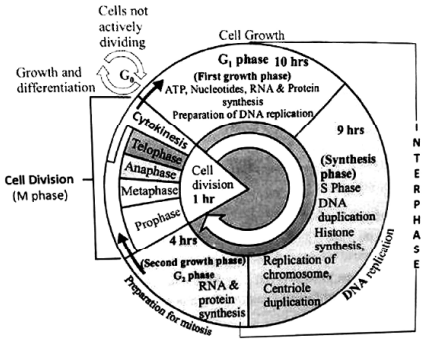
Ans. (b) : Chromosomes are arranged at equatorial plate during metaphase.
Chromosome can be seen best during metaphase stage. Metaphase start after prophase the spindle tube form and chromosome and aligned in the middle of the equatorial plate. The chromosomes are attached to the spindle tube at the centromere.
-Prophase begins immediately after the interphase. In this phase chromosomes resemble thin, coiled threads from starting and more visible in middle phase-Anaphase in which the chromatids in the centromere separate and move towards opposite sides of poles.
• Cell cycle was discovered by Prevost and Dumas (1824) while studying the cleavage of zygote of frog.

31. In 'S' phase of the cell cycle

(a) Amount of DNA doubles in each cell
(b) Amount of DNA remains same in each cell
(c) Chromosome number is increased
(d) Amount of DNA is reduced to half in each cell

AP EAMCET-24.09.2020 Shift-II
AIPMT-2014 / AIIMS-2013
CG PMT-2004

Ans. (a) : The interphase is characterized by G_1, S and G_2 phase. S phase marks the period during which the amount of DNA per cell doubles. DNA replication occurs in S phase.



32. The stage of cell cycle when cell has undergone differentiation is

(a) G_0 (b) G_1
(c) G_3 (d) G_4

BVP-2014, 2012 / DUMET-2007
MGIMS Wardha-2006 / AMU-2003

Ans. (a) : The cells which enter G0 phase start differentiation into specific types of cell. It is also known quiescent phase. Cell differentiation is the stage where cell loses its ability to divide and in this stage cell specialized in a particular type of function. Cell grows in the G1 phase and after that cell decides to undergo differentiation in G0 phase where cell decides to either grow special function by differentiation or enter into the S-phase.

33. During cell cycle, RNA and non-histone proteins are synthesized in

(a) S-phase (b) G_0 – phase
(c) G_2 – phase (d) M – phase

CMC Vellore-2010 / Punjab MET-2009, 2008
Rajasthan PMT-2009 / UP CPMT-2009 / AMU-2009

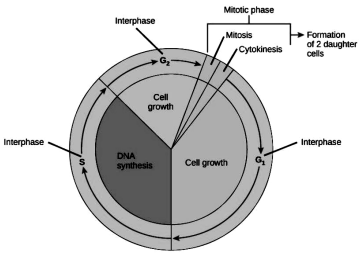
Ans. (c) : During cell cycle, RNA and non-histone protein are synthesized in G_2 phase.
G_2 phase is a period of rapid cell growth and protein synthesis during which the cell prepares itself for mitosis.
Pre-mitotic phase (Gap-2)
-Preparing cell for division
- Energy storage for chromosome movement.
-Mitotic specific protein
- RNA and microtubule subunits synthesize.

34. The correct sequence of different phases of cell cycle is

(a) S – G_1 – G_2 – M (b) G_1 – S – G_2 – M
(c) G_2 – S – G_1 – M (d) G_1 – G_2 – S – M

NEET-2020 Phase-II / NEET-2019
AMU-2014 / WB JEE-2012
AP EAMCET-2010 / WB JEE-2008
Rajasthan PMT-2003 / UPCPMT-2002 / AIIMS-1999

Ans. (b) :



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Cell cycle is the series of events in which cells replicate and make two new cells. Cell cycle consists of stages in the sequence- G_1, S, G_2 and M (Karyokinesis).

- G_1 is the stage where the cell is preparing to divide. S (synthesis phase) phase where the cell replicates all the DNA.
- G_2 stages, where it organized and condenses the genetic material, and prepares to divide.
- M stands for mitosis. It is further divided into four stages namely prophase, metaphase, anaphase and telophase. This is where the cell actually divides the two copies of the genetic material into the two daughter cells.

35. Assertion: (A): If the chromosome number is 2n during G_1, after S phase the chromosome number is the same

Reason (R): After S phase there is no increase in DNA per cell

The correct option among the following is

(a) A and R are true. R is the correct explanation for A

(b) A and R are true, but R is not the correct explanation for A

(c) A is true, but R is false

(d) A is false but R is true

TS EAMCET-11.05.2023, Shift-II

Ans. (c) : If the chromosome number is 2n during G_1, after S phase the chromosome number is the same. During the S-phase, DNA replication takes place but number of chromosomes will be same (2n).

After the S. phase the number of chromosome will be same but amount of DNA is doubles. Hence, after S. phase increase in amount of DNA per cell.

36. Identify the meiotic stage in which the homologous chromosomes separate while the sister chromatids remain associated at their centromeres

(a) metaphase - I (b) Metaphase - II

(c) Anaphase - I (d) Anaphase - II

TS EAMCET-11.05.2023, Shift-I

Ans. (c) : During anaphase-I the meiotic stage in which the homologous chromosomes separate while the sister chromatids remain associated at their centromeres.

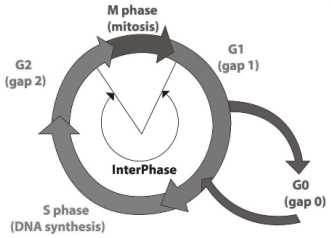
37. Which one of the following is the quiescent stage of cell cycle ?

(a) G_1 (b) G_0

(c) M (d) G_2

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : G_0 is called the quiescent stage of cell cycle, cells in G_0 phase are metabolically active but do not proliferate. G_0 phase is the phase of the cell outside the replicative stage. It is thought to be resting phase.



38. Select correct sequence of substages of Prophase-I of meiotic division:

(A) Zygotene (B) Pachytene

(C) Diakinesis (D) Leptotene

(E) Diplotene

Choose the correct answer from the options given below:

(a) (D), (A), (B), (E), (C)

(b) (A), (D), (B), (C), (E)

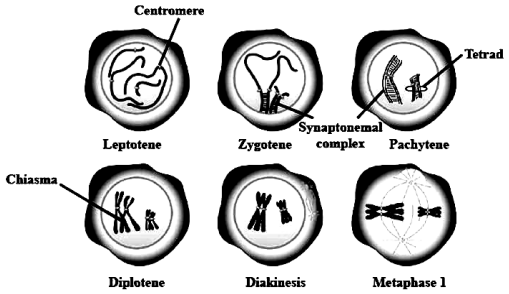
(c) (D), (B), (A), (E), (C)

(d) (A), (B), (D), (E), (C)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : According to meiosis-I, meiosis-I is initiated after the replication of the parental chromosomes in order to create identical sister chromatids in phases. The correct sequential manner of sub stages of prophase-I of meiotic division:

Leptotene, zygotene , Pachytene, Diplotene and Diakinesis.



39. During which stages of mitosis and meiosis, respectively does the centromere of each chromosome split?

(a) Telophase, Anaphase I

(b) Anaphase, Anaphase II

(c) Metaphase, Metaphase II

(d) Prophase, Telophase I

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Anaphase is the stage of mitosis after the process of metaphase in which chromosomes are split and newly- copied chromosomes are moved to opposite pole of the cell.

- Anaphase II is the stage when chromatids of every chromosome separate and begin to more toward the opposite ends of the cell.

40. The dissolution of synaptonemal complex occurs during

(a) Diakinesis (b) Leptotene

(c) Pachytene (d) Dilplotene

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : The synaptonemal complex is a protein structure that forms between homologous chromosomes during meiosis.

- Diplotene is fourth stage of the prophase of meiosis-I
- Chiasmata formation and dissolution of the synaptonemal complex occurs in diplotene stage.

  The beginning of diplotene is recognized by the dissolution of the synaptonemal and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the site of cross over.

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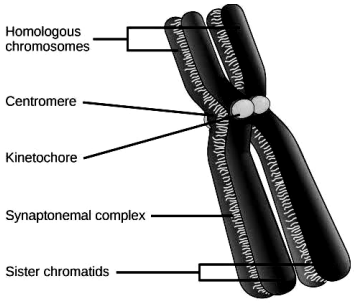


41. Select the correct statement.

A. Tetrad formation is seen during Leptotene.
B. During Anaphase, the centromeres split and chromatids separate.
C. Terminalizartion takes place during Pachytene.
D. Nucleolus, Golgi complex and ER are reformed during Telophase.
E. Crossing over takes place between sister chromatids of homologous chromosome.

Choose the correct answer from the options given below:

(a) B and E only (b) A and C only
(c) B and D only (d) A, C and E only

NEET (UG) 07.05.2023

Ans. (c) : Crossing over takes place during meiotic prophase i.e during pachytene each pair of chromosome has four chromatids at that time. Crossing over occurs between non-sister chromatids.

- The point of exchange of segments between non sister chromatids of homologous chromosomes during meiotic prophase is called **chiasma**.
- When the chiasma is located at the end of the pairing chromatids. It is known as terminal chiasma and when it is located in the middle part of non-sister chromated called interstitial chiasma later on interstitial chiasma is changed to terminal position by the process of chiasma terminalization.

42. Match List I with List II

	List I		List II
A.	**M Phase**	**I.**	**Proteins are synthesized**
B.	**G_2 Phase**	**II.**	**Inactive phase**
C.	**Quiescent stage**	**III.**	**Interval between mitosis and initiation of DNA replication**
D.	**G_1 Phase**	**IV.**	**Equational division**

Choose the correct answer from the options given below

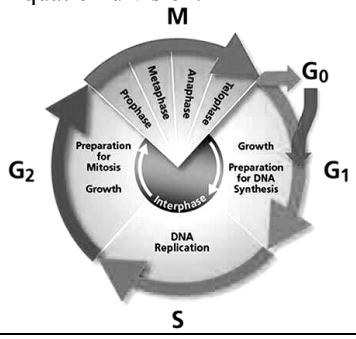
(a) A-II, B-IV, C-I, D-III
(b) A-III, B-II, C-IV, D-I
(c) A-IV, B-II, C-I, D-III
(d) A-IV, B-I, C-II, D-III

NEET (UG) 07.05.2023
AP EAMCET-2014

Ans. (d) : A cell cycle is a series of events that takes place in a cell as it grows and divides

- A cell spends most of its time in interphase and during this time, it grows and replicates its chromosome and prepare for cell division, the cell then leaves interphase undergoes mitosis, and completes its division.
- The time from end of one mitosis to the start of the next mitosis is called interphase.

G_1 Phase- G_1 is the interval between mitosis and initiation of DNA replication,
G_2 Phase- Protein are synthesized.
G_0 Phase- Quiescent stage / Inactive phase.
M - Phase- Equation division.



43. Match the following lists:

	List-I		List –II
A)	**Separation of homologous chromosomes**	**I)**	**Telophase**
B)	**Initiation of chromosomal pairing**	**II)**	**Kinetochore**
C)	**Chromosomal clustering at opposite spindle poles**	**III)**	**Anaphase-I**
D)	**Disc shaped part of centromere**	**IV)**	**Synapsis**

The correct match is:

	A	B	C	D
(a)	I	III	II	IV
(b)	III	IV	I	II
(c)	III	I	IV	II
(d)	II	I	IV	III

TS EAMCET-31.07.2022 Shift-I

Ans. (b) :

List-I	List -II
Separation of homologous chromosomes	Anaphase-I
Initiation of chromosomal pairing	Synapsis
Chromosomal clustering at opposite spindle poles	Telophase
Disc shaped part of centromere	Kinetochore

44. The appearance of recombination nodules on homologous chromosomes during meiosis characterizes :

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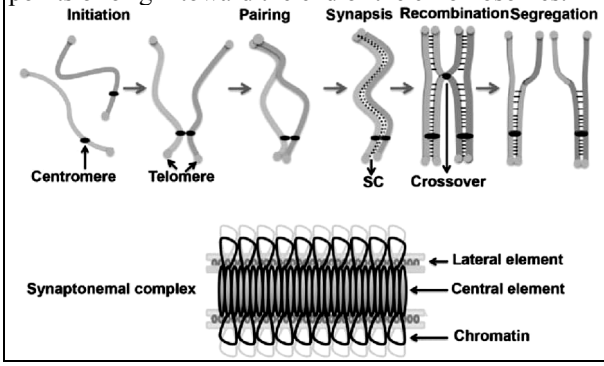
(a) Terminalization
(b) Synaptonemal complex
(c) Bivalent
(d) Sites at which crossing over occurs

NEET-2022

Ans. (d) : Pachytene stage of meiosis is characterized by the appearance of recombination nodules, the sites of which crossing over occurs between non-sister chromatids of homologous chromosomes.

Synaptonemal complex- The Synaptonemal complex is a highly ordered proteinaceous structure that assemble at the interface between aligned homologous chromosomes during meiotic prophase.

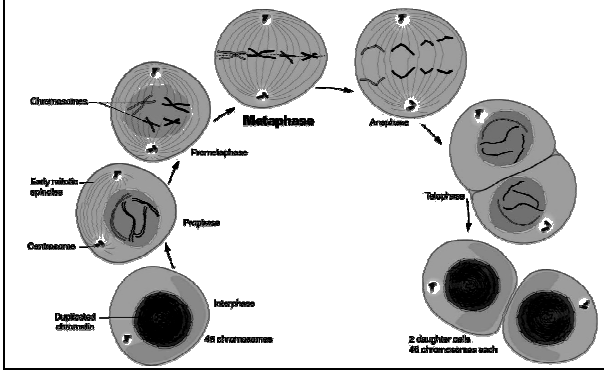
Terminalization - The movement of transverse bonds between paired chromosomes in meiosis from their points of origin toward the end of the chromosomes.



45. With respect to metaphase, which of the following statements is incorrect?
(a) Complete disintegration of nuclear envelope takes place
(b) Chromosomes are highly condensed
(c) Metaphase chromosomes are made up of four sister chromatids held together by centromere
(d) Chromosomes lie at the equator of the cell

NEET (Re-Exam)-04.09.2022

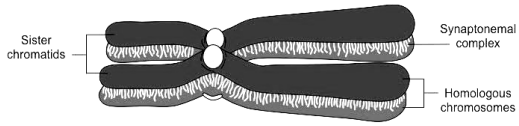
Ans. (c) : In metaphase, each chromosome is made up of two sister chromatids. Sister chromatids are identical copies of each other, and they are held together by a centromere. So, the statement that metaphase chromosomes are made up of four sister chromatids is incorrect.



46. Bivalent or Tetrad formation is a characteristic feature observed during:
(a) Synaptonemal complex in zygotene stage
(b) Chiasmata in Diplotene stage
(c) Synaptonemal complex in Pachytene stage
(d) Chiasmata in zygotene stage

NEET (Re-Exam)-04.09.2022

Ans. (a) : Synaptonemal complex is completely formed in zygotene phase of prophase-I of meiosis-I in which two homologous chromosomes paired and called bivalent or a tetrad. However these are more clearly visible at pachytene stage.

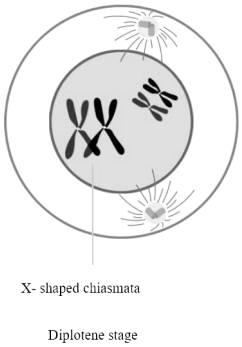


47. Which stage of meiosis can last for months or years in the oocytes of some vertebrates?
(a) Leptotene (b) Pachytene
(c) Diplotene (d) Diakinesis

NEET (Re-Exam)-04.09.2022

Ans. (c) : Diplotene is of longest duration in meiosis. In some vertebrates, cell gets arrested in diplotene for long duration.

- Cells like oocytes of some vertebrates (For example:- oocyte of mammalian females) are generally found arrested in the diplotene stage for years until the female reaches puberty.



48. Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?
(a) Pachytene (b) Leptotene
(c) Zygotene (d) Diakinesis

NEET-2021

Ans. (d) : In meiosis 1st, chiasmata (x-shaped structure) is formed in diplotene stage and chromosome are fully condensed. .

- But it terminalise in diakinesis stage.
- Bivalents are formed in Zygotene stage.
- Crossing over takes place in pachytene stage.
- Compaction of chromosomal material occurs in leptotene stage.

49. Match List-I with List-II.

	List-I		List-II
(A)	S phase	(i)	Proteins are synthesized
(B)	G_2 phase	(ii)	Inactive phase
(C)	Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication
(D)	G_1 phase	(iv)	DNA replication

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Choose the correct answer from the options given below

	(A)	(B)	(C)	(D)
(a)	(ii)	(iv)	(iii)	(i)
(b)	(iii)	(ii)	(i)	(iv)
(c)	(iv)	(ii)	(iii)	(i)
(d)	(iv)	(i)	(ii)	(iii)

NEET-2021

Ans. (d) :

(a)	S Phase	(iv)	DNA replication
(b)	G_2 Phase	(i)	Proteins are synthesized
(c)	Quiescent stage	(ii)	Inactive phase
(d)	G_1 Phase	(iii)	Interval between mitosis and initiation of DNA replication

50. 'G_0' stage of the cell cycle is characterized by _____

(a) Division inactive (b) Metabolically
(c) Metabolically active (d) Proliferation

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : G_0 stage of the cell cycle is also known as the quiescent stage. In this phase, the cell remains metabolically active but does not proliferate that means cell is performing its function without actively preparing to divide.

51. Fill in the blanks

During metaphase, spindle fibers attach to..... . Centromeres split and chromatids..... during..... .

(a) Telomere, Condense, Nucleolus
(b) Centromere, Unite together, Prophase
(c) Kinetochores, Separate, Anaphase
(d) Golgi complex, Move, Telophase

TS EAMCET-10.08.2021 Shift-I

Ans. (c) : During metaphase spindle fibers attached to kinetochores.

- Centromeres splits and chromatids separate during Anaphase.

Kinetochores are large protein complexes that assemble at the centromere of a chromosome, and function to connect the chromosomes to mitochondrial tubules in the mitotic spindle.

52. If onion root tip cell has 14 chromosomes and DNA content is 2C, what are the number of chromosomes and DNA content during G_1, S and G_2 phases respectively?

(a) 14, 2C; 14, 4C; 14, 4C
(b) 14, 4C; 14, 2C; 14, 4C
(c) 7, 2C; 7, 4C; 7, 2C
(d) 7, 2C; 14, 4C; 14, 2C

TS EAMCET-10.08.2021 Shift-I

Ans. (a) :

Phase	No. of chromosome	Chromosome Content
G_1	14	2C
S	14	4C
G_2	14	4C

If onion root tip cell has 14 chromosomes and DNA content is 2C then it will remain same in G_1 phase but in S-phase after the replication of DNA, DNA amount will be double i.e. 4C but chromosome number still remain same and in G_2 phase the chromosome number and the DNA amount will remain same as S- phase i.e. 14 and 2C respectively.

53. On imbibitions, pea seeds swell more compared to that of wheat seeds because they contain____

(a) Protein (b) Carbohydrate
(c) Lipids (d) Starch

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : The pea seeds swell more compared to that of wheat seeds because pea seeds have more imbibing capacity than wheat. The pea seeds are mostly composed of proteins. The wheat seeds are cereals which are enrich source of carbohydrate.

Imbibing capacity of protein is very high than carbohydrate i.e. on imbibitions pea seeds swell more compared to wheat seeds.

Imbibition is that process in which solid substance absorb water through their solid surface when seeds put in soil they become swell by absorbing water. This is called imbibition.

54. Colchicine checks_____

(a) Formation of spindle
(b) Replication of proteins
(c) Replication of DNA
(d) Replication of centrioles

AP EAMCET-24.09.2020 Shift-II

Ans. (a) : Colchicine is an alkaloid drug isolated from *Colchicum autumnale* It prevents mitosis in the metaphase by inhibiting the development of spindle fibre slowing the division of the centromere and preventing the division of the centriole. Cells begin mitosis but chromosome cannot be separated.

55. Identify the correct statement with regard to G_1 phase (Gap 1) of interphase.

(a) Reorganisation of all cell components takes place.
(b) Cell is metabolically active, grows but does not replicate its DNA.
(c) Nuclear Division takes place.
(d) DNA synthesis or replication takes place.

NEET-2020 Phase-I

Ans. (b) : In G_1 Phase the cell is metabolically active and continuously grows but does not replicate it's DNA.

- DNA replication take place S-phase stage but no change in chromosome number. Protein and enzyme synthesis take place at G_2 phase.

56. Dissolution of the synaptonemal complex occurs during

(a) Zygotene (b) Diplotene
(c) Leptotene (d) Pachytene

NEET-2020 Phase-I

Ans. (b) : The prophase stage of meiosis I^{st} (Prophase I^{st}) is divided into five stages which include Leptotene, Zygotene, Pachytene, Diplotene and Diakinesis.

- Diplotene is characterised by the dissolution of the synaptonemal complex. The recombined homologous chromosomes start separating except at

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the crossing over sites giving rise to x-shaped structures called chiasmata.

- Leptotene is characterised by gradual condensates of chromosomes.
- Zygotene is characterised by the pairing of homologous chromosomes, called synapsis, accompanied with formation of the synaptonemal complex.
- Pachytene stage in which exchange of segments of non-sister chromatids of homologous chromosomes occurs.
- Diakinesis is marked by the terminalisation of chiasmata. Nuclear membrane and nucleolus completely disappear by the end of this phase.

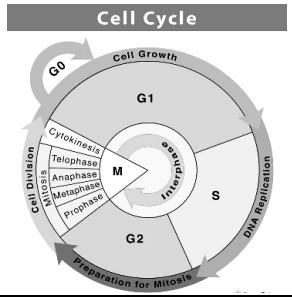
57. Some dividing cells exit the cell cycle and enter vegetative inactive stage. This is called quiescent stage (G_0). This process occurs at the end of

(a) G_1 phase (b) S phase
(c) G_2 phase (d) M phase

NEET-2020 Phase-I

Ans. (d) : Cell cycles are events that occur within a cell sequence and result in the division into two daughter cells.

- Four different stages of the cell cycle: G_1 phase, S phase (synthesis), the G_2 phase (collectively referred to as the interphase) and the M phase (mitosis and cytokinesis).



58. Match the following with respect to meiosis

(A) Zygotene (i) Terminalization
(B) Pachytene (ii) Chiasmata
(C) Diplotene (iii) Crossing over
(D) Diakinesis (iv) Synapsis

Select the correct option from the following

	(A)	(B)	(C)	(D)
(a)	(iv)	(iii)	(ii)	(i)
(b)	(i)	(ii)	(iv)	(iii)
(c)	(ii)	(iv)	(iii)	(i)
(d)	(iii)	(iv)	(i)	(ii)

NEET-2020 Phase-I
NEET-2016 Phase-II

Ans. (a) :

(A) Zygotene	–	(iv)	Synapsis
(B) Pachytene	–	(iii)	Crossing over
(C) Diplotene	–	(ii)	Chiasmata
(D) Diakinesis	–	(i)	Terminalization

59. Match the following events that occur in their respective phases of cell cycle and select the correct option :

A.	**G_1 phase**	**i**	**Cell grows and organelle duplication**
B.	**S phase**	**ii**	**DNA replication and chromosome duplication DNA**
C.	**G_2 phase**	**iii**	**Cytoplasmic growth**
D.	**Metaphase in M-phase**	**iv**	**Alignment of chromosomes**

(a) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

NEET-2020 Phase-II

Ans. (a) :

(A)	G_1 phase	(i)	Cell grows and organelle duplication.
(B)	S phase	(ii)	DNA replication and chromosome duplication
(C)	G_2 phase	(iii)	Cytoplasmic growth
(D)	Metaphase in M-phase	(iv)	Alignment of chromosomes

60. In human beings, during oogenesis, Meiosis-I into _____.

(a) A haploid large-sized secondary oocyte and a haploid smaller polar body.
(b) A haploid large-sized primary oocyte and a haploid smaller polar body.
(c) A diploid large-sized primary oocyte and a haploid small-sized polar body
(d) A haploid large-sized secondary oocyte and a diploid smaller polar body

MHT CET-06.10.2020 Shift-I

Ans. (a) : In oogenesis, meiosis I in human beings result in the formation of haploid large-sized secondary ococytes. Oogenesis occurs in the ovary of female animals. When the sperm cell touch the ovum cell then meiosis II start. which results in the formation of a haploid ovum and second polar body. The polar bodies are non-functional cells that degenerate. The ovum, on the other hand is the female gamete that can be fertilized by sperm to form a zygote.

61. Arrange the following events of mitotic cell cycle in series

(A) Reformation of nucleolus, golgi complex and ER
(B) Amount of DNA per cell doubles
(C) Disappearance of golgi complex and ER
(D) Condensation of chromatin into chromosome
(E) Distribution of mitochondria and plastids to daughter cells
(F) Separation of chromatids at centromere

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Options:
(a) B, C, D, F, A ,E (b) B, D, C, E, A, F
(c) B, D, C, F, A, E (d) B, D, C, F, E, A

AP EAMCET-24.04.2019 Shift-I

Ans. (c) : In mitotic cell division also called as duplication division. Amount of DNA per cell double. If initial amount 2c then it increases 4c.

- The chromatin condensed and spindle fibers form.
- In this stage disappearance of golgi complex & endoplasmic reticulum. Nuclear membrane disappears.
- Separation of chromatids and centromere both.
- Reformation of nucleolus, Golgi body and E.R. nuclear membrane begins to form chromatin (Stands of DNA)

62. Cells in G_0-phase of cell cycle
(a) Exit cell cycle (b) Enter cell cycle
(c) Suspend cell cycle (d) Terminate cell cycle

NEET-2019
WB JEE-2009

Ans. (a) : Cell in G_0-phase of cell cycle exit the cycle. It is resting phase or gap phase.

- Cell enters the G_0 phase from a cell cycle check point in G_1 phase. Cell resides in this phase until they receive appropriate signals.

63. Match the following

Set -I		Set-II	
(A)	**Condensation phase actually is the interval between Mitosis and initiation of DNA replication**	**(I)**	**M- Phase**
(B)	**Decondensation phase in which synthesis proteins takes place in preparation for mitosis**	**(II)**	**S- Phase**
(C)	**Replication in which the amount of DNA per cell doubles**	**(III)**	**G_1-Phase**
(D)	**Quiescent stage or inactive stage**	**(IV)**	**G_2- Phase**
		(V)	**G_0- Phase**

The correct answer is

	(A)	(B)	(C)	(D)
(a)	(iii)	(iv)	(ii)	(v)
(b)	(i)	(iii)	(ii)	(v)
(c)	(iii)	(i)	(ii)	(iv)
(d)	(i)	(ii)	(iii)	(iv)

TS EAMCET-03.05.2018 Shift-I

Ans. (a) : G_1-phase :- It is an intermediate phase that exists between M phase and S phase of cell cycle. It is also known as gap 1 phase or growth one phase. In this phase cell accomplish their most of the growth and prepaid itself for DNA replication.

G_2-phase :- It is a stage of further growth of the cell and it is preparation for division. During this stage synthesis of RNA and proteins occur.

S-phase :- It is called synthesis phase marks the period during which DNA synthesis takes place amount of DNA per cell double.

G_0-phase :- They do not divide further exit G_1-phase to enter an inactive stage called G_0 stage of cell cycle

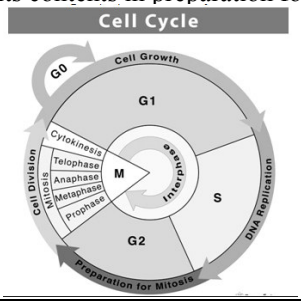
64. Interphase divides into:
(a) G_1, S, G_2
(b) Mitosis
(c) Prophase, metaphase, Anaphase, Telophase
(d) Cytokinesis

AIIMS-26.05.2018 Shift-I
Karnataka CET-2000

Ans. (a): Interphase is the longest part of the cell cycle. This is when the cell grows and copies its DNA before moving into mitosis. During mitosis, Chromosome will align, separate, and move into new daughter cells.

Interphase - Interphase consists of three steps -

- **G_1 phase :** first gap phase; the cell grow larger and organelles are copied.
- **S phase :** Synthesis phase; the cell synthesis a complete copy of the DNA in its nucleus.
- **G_2 phase :** Second gap phase; the cell grow more, makes proteins and organelles, and begins to reorganize its contents in preparation for mitosis.



65. The size of the chromosome is measured during
(a) Interphase (b) Prophase
(c) Metaphase (d) Anaphase

SRM JEEE -2017

Ans. (c) : During metaphase the nucleus dissolves and the cells chromosomes condense and move together, alighting in the center of the dividing cell. At this stage, the chromosomes are distinguishable when viewed through a microscope.

66. Which is synthesised in G_1-phase?
(a) DNA polymerase (b) Histones
(c) Nucleolar DNA (d) Tubulin protein

UP CPMT-2004
MGIMS Wardha-2004

Ans. (a) : DNA polymerase is synthesized in G_1 phase

- Cell growth (Gap -1) or (G_1-Phase)

Extensive metabolic Activity
-Grow in size and specific enzymes are produced
- DNA base units are accumulated

- DNA polymerases are widely used for DNA manipulation including DNA cloning, sequencing, labeling etc.
- Histone proteins are discovered by Albrecht Kossel. Histones bind to DNA give chromosomes and their shape and control the activity of genes.
- Tubulin proteins are found primarily found in centrosomes and spindle pole bodies.

67. Which phase comes in between the G_1 and G_2 phases of cell cycle?
(a) M - phase (b) G_0 - phase
(c) S - phase (d) Interphase

WB JEE-2010

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Ans. (c) : • S-phase comes in between the G_1 and G_2 phases of cell cycle
• DNA is replicated during S-phase of inter-phase
• Diploid cells (2n) have 2 sets of chromosomes. One set comes from mom, the other from Dad.

1 chromosome 1 chromosome
1 chromatid 2 chromatids

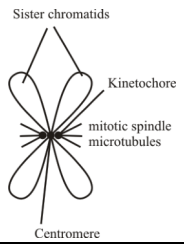
• A cell spends most of its time in inter phase and during this phase it grows, replicates its chromosomes and prepares for cell division.
The DNA is replicates in the preceding S-phase, the two copies of each replicated chromosome (called sister chromatids) remain glued together by cohesive complexes.

68. Diagrammatic representation of all chromosomes at metaphase is called
(a) Ideogram (b) Cardiogram
(c) Karyotype (d) Leotype
BVP-2010

Ans. (a) Diagrammatic representation of all chromosomes at metaphase is called Ideogram.
-Ideogram is a picture of symbol used in a system of writing to represent a thing or an idea but not a particular word or phrase for it.
- Cardiogram is synonyms of ECG. It is a graphical recording of the cardiac cycle produced by an electrocardiograph
- A normal human karyotype consists of 22 pair of autosome and two sex chromosomes. Total 23 pair chromosome

69. Small disc–shaped structures at the surface of the centromeres that appear during metaphase are
(a) Kinetochores (b) Metaphase plate
(c) Spindlefibres (d) Chromatid
AFMC -2009

Ans. (a) : Small disc-shaped structures at the surface of the centromeres that appears during metaphase are kinetochores. Kinetochores are a proteinaceous structure. It forms at the centromere of every chromosome.
- Spindle fibre forms a proteinaceous structure that divides the genetic material in a cell.
- Term chromatid was proposed by MC Clung (1900) chromatid are formed during chromosome duplication.



70. The point at which crossing over occurs is called as :
(a) Chiasmata (b) Centromere
(c) Chromosome (d) Gene loci
BHU PMT-2001

Ans. (a) : The point at which crossing over occurs is called as chiasmata.
A chiasma is the point of contact between 2 chromatids belonging to homologus chromosome
Chiasmata are visible only in the diplotene stage of prophase-I of meiosis X-shaped structures.
Centromere link a pair of sister chromatid together during cell division.
Gene loci are the physical site or location of a specific gene on a chromosome.

71. Chromosomes are visible with chromatids at this phase of mitosis
(a) Interphase (b) Prophase
(c) Metaphase (d) Anaphase
J&K CET-2008

Ans. (b) : Chromosome are visible with chromatids at prophase of mitosis. The main occurence in prophase are the condensation of chromatin reticulum and the disappearance of the nucleolus.

72. The phase of cell cycle during which DNA + polymerase is functionally active is:
(a) S (b) G_2
(c) G_1 (d) M
Karnataka CET-2002

Ans. (a) : The phase of cell cycle during which DNA Polymerase is functionally active is S-phase DNA replication takes place in S-phase of inter phase.
DNA polymerase is responsible for DNA replication. Thus its activity will be seen maximum during S-phase.
G_2 phase – RNA and protein synthesis complete. Tubuline protein is a protein which formed the spindle fibres synthesis occurs in G_2 phase.

73. Which of the following event occurs during G_1-phase?
(a) DNA replication
(b) Growth and normal function of cell
(c) Mutation
(d) Fertilization
DUMET-2008

Ans. (b) : Growth and normal function of cell is occurs during G_1- phase. In this phase cell remains metabolically active and continuous to grow and function normally.

74. The stage during which, cell decides to get specialized
(a) S- phase (b) M-phase
(c) G_1-phase (d) G_2- phase
DUMET-2008
AMU-1995

Ans. (c) : During G_1 phase, cell decides to get specialized. G_1 is a resting phase. During S-phase DNA synthesis takes place and G_2 phase is again a resting phase following DNA synthesis. These 3 phases via G_1, S, G_2 constitute interphase, while the main mitotic division takes place during M-phase.

75. Significance of meiosis lies in:
(a) Reduction of chromosome number to one half
(b) Maintaining consistency of chromosome number during sexual reproduction

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(c) Production of genetic variability
(d) All of the above

HP CET-2011
VMMC-2005 / AMU-2004

Ans. (d) : Significance of meiosis lies in reduction of chromosome number to one half, maintaining consistency of chromosome number during sexual reproduction and production of genetic variability. Mitosis is necessary for growth and reproduction if only asexual method is present.
However in sexual methods of reproduction, fusion of gametes (male and female) is required.

76. Meiosis can be observed in:
(a) Tapetal cells (b) Megaspores
(c) Microspores (d) Spore mother cells

HP CET-2011

Ans. (d) : Meiosis can be observed in spore mother cell. It is obvious the study of mitosis that daughter cell resting from a mitotic division have same chromosome number as the parental cell had.
The vascular plant produce cell called spore mother cell these are diploid (2n) and represent last stage of the sporophyte generation and produce gametes by meiosis or reductional division.
- The tapetal cell is a specialised layer of nutritive cell, found within the anther of flowering plants.
- Microspores are generated within the pollen sac of the anther in flowering plants. When the microspore germinates it is known as a pollen grain.
- Megaspores also called macrospores are a type of spore that is present in heterosporous plants, germinates into female gametophyte which produces egg cell.

77. In man the meiotic cell division takes place in :
(a) Gonads (b) Nerve cells
(c) Muscular tissue (d) None of these

JIPMER-1999

Ans. (a) : Meiosis is a type of cell division that occurs in the gonads, which are the reproductive organs. it is a reductional division i.e. number of chromosomes in the daughter cells is half the number of chromosomes in the parent cell. This is necessary because the germ cells, which are the cell that give rise to gametes (eggs and sperms) only need half the amount of genetic material.

78. Which of the following characters is related with telophase?
(a) Formation of nuclear membrane
(b) Formation of nucleolus
(c) Elongation of chromosome
(d) Formation of two daughter nuclei

BCECE-2014
BHU PMT (Screening)-2009 / VMMC-2009

Ans. (d) : Formation of two daughter nuclei is related with telophase.
Telophase is the final phase of cell division between anaphase and inter phase in which the chromatids or chromosome move to opposite ends of the cell and two nuclei are formed.
During telophase chromosome arrive at opposite poles and uncoil into thin strand of DNA the spindle fibers disappear, and the nuclear membrane reappears.

79. Find out the correct statement
(a) During mitosis endoplasmic reticulum and nucleolus disappear completely at early prophase
(b) Chromosomes are arranged along the equator during prophase of mitosis
(c) Chromosome is made up of two sister chromatids at anaphase of mitosis
(d) A cell plate is laid down during interphase
(e) Small disc shaped structures at the surface of the centromeres that appear during metaphase are kinetochores

Kerala PMT-2015

Ans. (e) : A small disc shaped structure at the surface of the centromeres that appear during metaphase are kinetochores. Kinetochores are made up of proteins. It forms at the centromere of every chromosome.
Kinetochores are large protein assemblies that connect chromosomes to microtubules of mitotic and meiotic spindle in order to distribute the replicated genome from a mother cell to its daughters.

80. Which of the following products are obtained by anaerobic respiration from yeast?
(a) Alcohols (b) CO_2
(c) Beer and wine (d) All of these

JIPMER-2003

Ans. (d) : Alcohol, CO_2, Beer and wine are obtained by anaerobic respiration from yeast.
The yeast is eukaryotic, single-celled microorganism. Yeasts have two main uses in food production of baking and making alcoholic beverages.
Anaerobic respiration is the type of respiration in which cell can break down sugar to generate energy in the absence of oxygen.

$$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2ATP + 2CO_2$$
(Glucose) (Ethanol) (Energy)

81. Chiasmata are most appropriately observed in meiosis during:
(a) diakinesis (b) diplotene
(c) metaphase II (d) pachytene

MGIMS Wardha-2004

Ans. (b) : Chiasmata are most appropriately observed in meiosis during diplotene. Chiasmata formation takes place at a point where the crossing over occurs. Crossing over occurs between the non-sister chromatids of the homologous chromosomes. There is a exchange of genetic material take place between non-sister chromatids of the homologous chromosomes.

82. The two chromatids of a metaphase chromosome represent:
(a) Replicated chromosomes to be separated at anaphase
(b) Homologous chromosomes of a diploid set
(c) Non-homologous chromosomes joined at the centromere
(d) Maternal and paternal chromosomes joined at the centromere

Karnataka CET-2003

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Ans. (a) : The two chromatids of a metaphase chromosome represent replicates chromosomes to be separated at anaphase.

During prophase the nucleus disappears, spindle fibers form and DNA condenses into chromosomes (sister chromatids). During metaphase sister chromatids align along the equator of the cell by attaching their centromere to spindle fibre

During anaphase, sister chromatids are seprated at the centromere and are pulled towards opposite poles of the cell by the mitosis spindle.

83. Match the column I and column II and choose the correct option initiation.

Column I	Column II
(A) Initiation of spindle fibres	(1) Anaphase?
(B) Synthesis of RNA and protein	(2) Zygotene
(C) Action of endonuclease	(3) G_1 – phase
(D) Movement of chromatids towards the opposite poles	(4) Pachytene
	(5) Anaphase-II

Option

(a) A-2 B-3 C-4 D-5
(b) A-3 B-2 C-1 D-5
(c) A-1 B-3 C-5 D-4
(d) A-5 B-3 C-1 D-2

Manipal-2015

Ans. (a) : Initiation of spindle fibres formation begins in the zygotene phase of the prophase-I of meiosis.

- RNA and protein synthesis takes place during the G_1 and G_2 phase.
- Endonucleases help in the seperation of the chromosomes in the pachytene stage in which crossing over takes place.
- In anaphase II, the sister chromatids seperate and are pulled towards opposite poles of the cell.

84. When yeast ferments glucose the products are :

(a) ethanol and carbon dioxide
(b) methanol and CO_2
(c) water and carbon dioxide
(d) ethanol and water

JCECE-2003
Rajasthan PMT-2002
JIPMER-2000

Ans. (a) : When yeast (*saccharomyces*) ferments glucose and formed ethanol and carbon dioxide (CO_2).

$$C_6H_{12}O_6 \xrightarrow{\text{yeast}} 2C_2H_5OH + 2CO_2$$

(Glucose) (Ethanol) (Carbondioxide)

"Yeast is a fungus that grows as a single cell, rather than as a mushroom", yeast is typically considered a vegan food."

Methanol is produced from petroleum product (synthesis gas) via Hydrogenation of CO and CO_2 and remove water.

85. If you are provided with root-tips of onion in your class and are asked to count the chromosomes, which of the following stages can you most conveniently look into?

(a) Metaphase (b) Telophase
(c) Anaphase (d) Prophase

Manipal-2007
AIPMT-2004

Ans. (a) : Chromosomes arrange themselves in the centre or on the equator of spindle. chromosomes become shorter and thicker. In metaphase, the chromosomes are at their most condensed and are arranged in a single line across the center of the cell. This make them easy to observe and count.

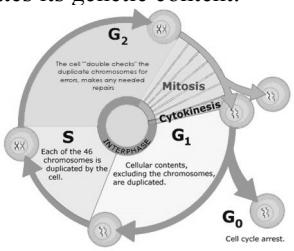
86. In the somatic cell cycle

(a) In G_1 phase DNA content is double the amount of DNA present in the original cell
(b) DNA replication takes place in S-phase
(c) A short interphase is followed by a long mitotic phase
(d) G_2 phase follows mitotic phase

Manipal-2014, 2007
AIPMT-2004

Ans. (b) : The Somatic cell cycle occurs in non-reproductive cells. Such cycle consists only 2 phases i.e. interphase and M phase. Interphase consists of G_1, S and G_2 phase.

S-phase is the period of DNA synthesis during which the cell replicates its genetic content.



87. In which one of the following stages of cell division, the DNA content doubled?

(a) Interphase (b) Metaphase
(c) Prophase (d) Anaphase

Manipal-2014, 2006

Ans. (a) : In Interphase the DNA content doubled. Duplication of DNA occurs in the S-phase of

- During metaphase the nucleus, dissolves and the cell chromosomes condense and move together.
- During anaphase, each pair of chromosomes is separated into two identical, independent chromosomes.
- During prophase condensation of the chromatin takes place and the disappearance of the nucleolus occur.

88. An egg cell has 5 pico gram of DNA in its nucleus. How much amount of DNA will be in this animal at the end of G_2 phase mitosis?

(a) 2.5 pico gram (b) 5 pico gram
(c) 5 gm (d) 20 pico gram

Manipal-2014, 2006

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Ans. (d) : Egg cell and sperm cell are produced by meiotic division and contain haploid no. of chromosome. Animal somatic cell are diploid contain 10 pico gram of genetic material, Duplication of generic material occurs in S phase, so amount of genetic material in G2 phase will be 20 pico-gram.

89. Replication of centriole occurs during:

(a) interphase (b) prophase
(c) late prophase (d) late delophase

BHU-PMT (Screening)-2008
BHU PMT-2004

Ans. (a) : During the S-phase of the interphase, the centrioles separate and undergo duplication which produces two pairs of centrioles. Thus replication of centrioles occurs during interphase.

90. Which of the following is unique to mitosis and not part of meiosis ?

(a) Homologous chromosomes behave independently
(b) Chromatids are separated during anaphase
(c) Homologous chromosomes pair and form bivalents
(d) Homologous chromosomes crossover

DUMET- 2009

Ans. (a) : In the Eukaryotic cell cycle, chromosome duplication occurs during S-phase of inter phase and chromosome segregation occurs during M-phase (the mitosis phase). Homologous chromosomes behave independently during mitosis, which is not a part of meisois.

91. Synaptonemal complex is a ribonucleo protein structure reported by Moses 1956. It is visible from

(a) leptotene through diplotene
(b) pachytene through diplotene
(c) zygotene through pachytene
(d) diplotene through metaphase

CMC Vellore-2007

Ans. (c) : Synaptonemal complex is a ribonucleo protein structure reported by Moses 1956. It is visible from zygotene through pachytene. During leptotene stage the chromosome become gradually visible under the light microscope. The compaction of chromosome continues throughout leptotene. This is followed by the second stage of prophase-I called zygotene and zygotene is followed by pachytene. In pachytene stage crossing over occurs.

92. If we ignore the effect of crossing over, how many different haploid cells arise by meiosis in a diploid cell having 2n = 12 ?

(a) 8 (b) 16
(c) 32 (d) 64

AFMC-2006

Ans. (d) : Meiosis a type of cell division that reduces the number of chromosomes in a cell by half. So, a diploid cell with 2n = 12 will produce four haploid cells with n = 6 chromosomes each. The number of different haploid cells that can be produced by meiosis is 2^n, where n is the number of chromosomes in the haploid cells. In this case $2^6 = 64$ different haploid cells can be produced.

93. The stage at which cleavage or cytokinesis begins in animal cell is

(a) anaphase (b) telophase
(c) interphase (d) G_0 Phase

CMC Ludhiana-2007

Ans. (a) : Cytokinesis begins in anaphase and ends in telophase reaching completion as the next interphase begins. The first visible change of cytokinesis in an animal cell is the sudden appearance of a pucker or cleavage furrow on the cell surface.
Interphase is the phase of the cell cycle in which a typical cell spends most of its life.

94. The largest phase of meiosis-I is

(a) prophase–I (b) metaphase–I
(c) anaphase–I (d) telophase–I

BHU-PMT (Screening)-2008

Ans. (a) : Prophase-I is the longest phase of meiosis. It occurs in five stages they are Leptotene, Zygotene, pachytene diplotene and diakinesis
Sequence of meiosis-I is prophase, metaphase anaphase and telophase.
In prophase-I the strands of DNA and protein known as chromatin condenses to form chromosome.
In metaphase-I the homologous pair of chromosome align on either side of the equatorial plate.
The chromosome migrates in opposite direction during the third stage of meiosis-I known as Anaphase-I.
During telophase-I the chromosome are enclosed in nuclei.

95. In which of the following stage, the chromosome is single, thin and like long thread?

(a) Leptotene (b) Zygotene
(c) Pachytene (d) Diakinesis

CMC Ludhiana-2008

Ans. (a) : Leptotene also known as leptonema is the first stage of prophase-I of meiosis. In this stage chromosome appears thin and long and during which individual chromosome begin to condense into long strands within the nucleus which are loosely interwoven. However the two sister chromatid are still so tightly bound that they are indistinguishable from one another. They possess a string of swollen area called chromosome.

96. The prophase-I of the meiotic division has sub-stages.

(a) two (b) three
(c) five (d) six

Haryana PMT-2011

Ans. (c) : In meiotic division, the prophase is the most elaborated stage and has five sub stages- Leptotene, zygotene, pachytene, diplotene and diakinesis
Meiosis comprises of one interphase by two nuclear division meiosis-I and meiosis-II.
Meiosis - I $\rightarrow$ It is reductional division.
Meiosis - II$\rightarrow$ It is equational division.

97. While working in a lab, a student forgot to add colchicine while karyotyping through blood culture technique. Then what will happen:

(a) mitosis will be arrested at metaphase

@apna_pdf

(b) chromosomal division will continue and each chromosome will have four arms.
(c) chromosomal division will continue
(d) mitosis will be arrested at telophase

GUJCET-2014

Ans. (c) : Colchicine is a drug that inhibits the formation of microtubules, which are essential for cell division. If colchine is not added, to chromosomes will continue to divide and the cell will not be arrested at metaphase. This will result in a cell with doubled chromosome member. This is because the chromosomes will be able to replicate twice without being separated. This can lead to variety of chromosomal abnormalities, including Down syndrome.

98. The proteins involved in the movement of chromosomes towards the poles during cell division are
(a) actin (b) myosin
(c) tubulin (d) elastin

AP EAMCET-2008

Ans. (c) : The spindle apparatus formed during cell division is composed of microtubules radiating in all directions. The microtubules are chemically composed of tubulin protein (α- tubulin, β-tubulin).
These are helpful during cell division to separate the chromosome at anaphase and helps in the movement of chromosome toward the poles.

99. In cell cycle, during which phase, chromosomes are arranged in equatorial plates?
(a) Metaphase (b) Anaphase
(c) Telophase (d) Prophase

JIPMER-2009

Ans. (a) : During cell cycle chromosome are arranged in a equatorial plate which is known as Metaphasic stage. Metaphase is a stage of mitosis in the eukaryotic cell cycle in which chromosome is at their second-most condensed and coiled stage.

100. Most cytogenic activity occur during
(a) interphase (b) telophase
(c) prophase (d) anaphase

UP CPMT-2005

Ans. (a): Cytogenic activity is those that involve the nucleus of the cell. These activities include DNA replication, transcription and translation. Most of these activities occur during interphase, The interphase is divided into G1, S, G2, M, which is the longest phase of the cell cycle. During interphase the cell grows and duplicates its DNA in preparation for cell division.

- **Prophase** → Condensation of chromosomes.
- **Telophase** → During telophase, the chromosome is arrive at the cell poles.
- During **Anaphase**, each pair of chromosome is separated into two identical independent chromosomes.

101. Match the following list.

List I	List II
(A) G_2 phase	(i) Fusion of microtubules to from spindle apparatus
(B) Prometaphase	(ii) Production of energy required for spindle formation
(C) Anaphase	(iii) Recombination of genetic material
(D) Pachytene	(iv) Contraction of tubulin proteins
	(v) Reappearance of Plasmosome

The correct match is

	A	B	C	D
(a)	(v)	(iv)	(ii)	(iii)
(b)	(ii)	(iv)	(i)	(v)
(c)	(v)	(i)	(iv)	(ii)
(d)	(ii)	(i)	(iv)	(iii)

AP EAMCET-2013

Ans. (d) : G_2 Phase-Production of energy required for spindle fibers.
Prometaphase - Fusion of microtubles to form spindle apparatus.
Anaphase - Contraction of tubuline proteins.
Pachytene - Recombination of genetic material.

102. Interval between two successive cell division, better known as resting phase, but is actually a period of great biosynthetic activity is called as
(a) Interphase
(b) Synthetic phase (S-phase)
(c) M-phase
(d) G_2-phase

UP CPMT-2014

Ans. (a): Interphase– Interphase of cell cycle is better known as resting phase, but infact it is a period of great biosynthetic activity 90% of cell cycle formed by interphase.
When a cell completes the mitotic phase of the first cell cycle, two cells are formed. The interphase is the resting phase between two mitotic phases. It is the phase in which the cell spends most of its life.
S-phase– S-phase is characterized by replication of DNA molecule.
M-phase– M-phase is mitosis phase also called as somatic cell division.
G_2 phase– G_2 phase is a period of rapid cell growth and protein synthesis during which the cell prepares itself for mitosis.

103. The phragmoplast is organised at the
(a) Beginning of anaphase
(b) End of anaphase
(c) Beginning of telophase
(d) End of telophase

UP CPMT-2011

Ans. (b): Phragmoplast is a complex arrangement of microtubules, microfilaments. Golgi derived vesicles and endoplasmic reticulum that gives rise to the cell plate during the cytokinesis. It mainly take place at the end of anaphase. The formation of cell plate completely separates the two daughter cells at the telophase.

104. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in

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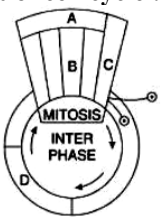
(a) Polytene (b) Aneuploidy
(c) Polyploidy (d) Somaclonal variation

NEET-2016 Phase-I

Ans. (c) :
A cell at the telophase stage shows no formation of a cell plate and contains more chromosomes as compared to other dividing cells. This would result in **polyploidy.**

- **Polytene** refers to a condition in which DNA constantly replicates without separation. This results in the formation of a giant chromosome called the **polytene chromosome.**
- **Aneuploidy** is a condition characterized by the gain or loss of one or more chromosomes. It occurs when chromatics fail to segregate during cell division.
- **Somaclonal Variation** is a phenomenon observed in plant tissue culture. The variation occurs due to chromosomal rearrangements.

105. Given below is a schematic break-up of the phases / stages of cell cycle :

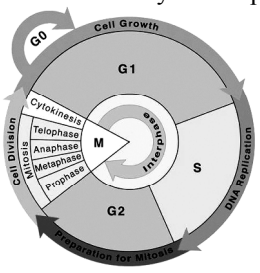


Which one of the following is the correct indication of the stage / phase in the cell cycle ?

(a) A-Cytokinesis (b) B-Metaphase
(c) C-Karyokinesis (d) D-Synthesis phase

AIPMT-2009

Ans. (d) : Mitosis is a sexual cell division that involves production of two offspring's at the end of the cell cycle. It consists of interphase (G-1 phase S-phase and G-2 phase) and M-phase (mitosis phase). The mitosis phase is divided into two stages – karyokinesis and cytokinesis. Karyokinesis is divided into four stages – prophase, metaphase, anaphase and telophase.
In the given figure–
A – Karyokinesis B – Anaphase
C – Cytokinesis D– synthesis phase



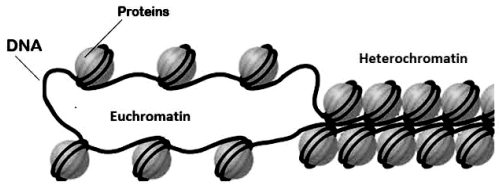
106. In S–phase, DNA is replicated in a medium containing radioactive thymidine, radioactivity will be observed in

(a) Euchromatin (b) Heterochromatin
(c) Both a and b (d) Nucleolus

AIPMT-1998

Ans. (c) : S phase includes replication of both euchromatin and heterochromatin DNA, the radioactive thymidine will be incorporated in both types of DNA.

- Euchromatin is closely loosely packed DNA with higher gene concentration as compared to heterochromatin which is tightly packed less DNA content.



107. Colchicine is an inhibitory chemical , which:

(a) prevents the spindle formation in mitosis
(b) prevents the formation of equatorial plane
(c) stops the functioning of centriole
(d) prevents attaching of centromeres with rays:

VMMC-2002

Ans. (a) : Colchicine is indeed an inhibitory chemical. It is a naturally occurring alkaloid compound found in the *Colchicum autumnale* plant, commonly known as autumn crocus or meadow saffron. Thus, colchicine is an inhibitory chemical which prevents the spindle formation in mitosis.

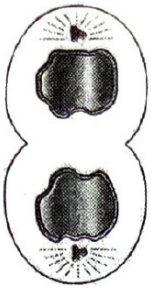
108. During which phase (s) of cell cycle, The amount of DNA in a cell remains at 4C level if the initial amount is denoted as 2C?

(a) G_0 and G_1 (b) G_1 and S
(c) Only G_2 (d) G_2 and M

AIPMT-2014

Ans. (c) : In the G_2 and M phase of the cell cycle, the amount of DNA in a cell remains at 4C level. When the initial amount is denoted as 2C in M-phase, both 4C and 2C of DNA are present in different stages. S-phase marks the period during which the amount of DNA in the cell doubles. Thus, at G_2 phase the amount of DNA is 4C. These doubled cellular contents prepare the cell to sustain in the further mitotic division.

109. A stage in cell division is shown in the figure. Select the answer which gives correct identification of the stage with its characteristics.



(a)	Prophase	Endoplasmic reticlulum and nucleolus not reformed yet
(b)	Telophase	Nuclear envelop reforms, golgi complex reforms
(c)	Late anaphase	Chromosomes move a away from equatorial plate, golgi complex not present

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(d)	Cytokinesis	Cell plate formed, mitochondria distributed between two daughter cells

NEET-2013

Ans. (b) : In a Telophase mitotic spindles break down, decondensation of chromosome present at opposite poles occur nuclear envelop begins to form around each chromosomal set Golgi complex reform cytokinesis involves the cytoplasmic components to separate physically to form two daughter cells. These cell each enter an interphase of their own and begin a new cell cycle round.

110. During the cell cycle, 2 molecules of DNA are present in a chromosome in the :-

(a) G_1 phase (b) End of S phase
(c) End of M phase (d) G_2 phase

AIIMS-2001

Ans. (b) : The cell cycle is generally divided into two phase**.(i) Interphase (ii) mitosis**.

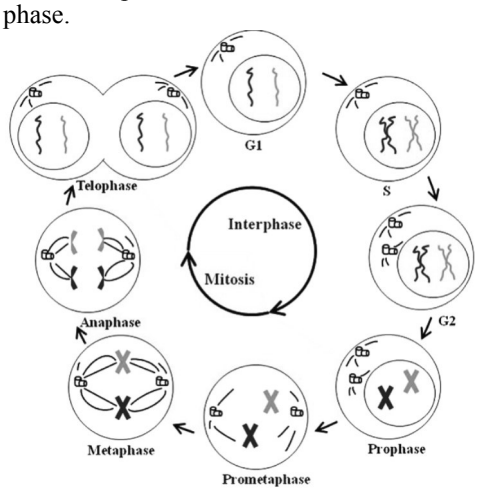
During **interphase**, the cell spends most of time performing the functions that make it unique. **Mitosis** is the phase of the cell cycle during which the cell divides into two daughter cells.

• **Interphase -** The interphase stage of the cell cycle include three distinctive parts i.e **G_1-phase**, **S-phase** and **G_2-phase.**

• The **G_1-phase** follows mitosis and is the period in which the cell is synthesizing, its structural proteins and enzymes to perform its functions.

• **S-phase -** During the S-phase or **synthetic phase** of interphase, replication of DNA and synthesis of histone proteins occur. New histones are required in massive amounts immediately at the begining of the S period of DNA synthesis to provide the new DNA with nucleosomes. Thus, at the end of S phase, each chromosome has two DNA molecules and a duplicate set of genes. S phase occupies roughly 35 to 45 percent of cell cycle.

• **G_2 phase -** This is a second gap or growth phase or resting phase of interphase. During G_2 phase, synthesis of RNA and proteins continues which is required for cell growth. It may occupy 10 to 20 percent time of cell cycle. As the G_2 phase draws to a close, the cell enters the M phase.



111. Barr Body is found in the cytoplasm during :-

(a) Interphase in cell of female mammal
(b) Interphase in cell of male mammal
(c) Prophase in cell of female mammal
(d) Prophase in cell of male mammal.

AIIMS-2001

Ans. (a) : Barr body is found in the cytoplasm of interphase cells of female mammals. It is condensed, inactive X chromosomes. Females have two X chromosomes, while males have one X chromosome and one Y chromosome, In female cells, one of the X chromosomes is inactivated to prevent too much gene expression from X-linked genes. The inactivated X chromosome is called a Barr body.

• Barr body is a small body which stains intensely with nuclear dyes.

• Barr body found at the rim of nucleus in female somatic cells between division.

Barr body = No. of x-chromosome – 1.

112. During cell division a cell plate is produced during:

(a) metaphase (b) telophase
(c) cytokinesis (d) anaphase

UP CPMT-2007
J&K CET-2000

Ans. (c) : During cell division, formation of cell plate occur during cytokinesis. Cytokinesis begins at Anaphase and ends during telophase. In the process of cell plate formation the cytoplasm of plant cells portioned from inside out and form a new cell wall called cell plate.

113. Centromere is required for–

(a) transcription
(b) crossing over
(c) cytoplasmic cleavage
(d) movement of chromosomes towards poles

Uttarakhand PMT-2010

Ans. (d) : The centromere is a specialized region of a chromosome that is responsible for the attachment of the mitotic spindle fibers. These spindle fibres are responsible for cell division.

114. Interphase nucleus is enclosed by

(a) non-porous nuclear membrane
(b) porous double nuclear membrane
(c) non-porous double discontinuous nuclear membrane
(d) a single porous unit membrane

Punjab MET-2007

Ans. (b) : A nuclear membrane keep the chromosomes apart from the rest of the cell. The nuclear membrane includes a series of small pores that allow the passage to certain object. Such as nucleic acids and proteins between the nucleus and cytoplasm.

115. Which is not character of mitosis?

(a) Leptotene (b) Zygotene
(c) Pachytene (d) All of these

CG PMT-2005

@apna_pdf

Ans. (d) : Leptotene, zygotene, and pachytene are three of the substages of prophase I in meiosis, which is a different type of cell division than mitosis. Mitosis is a type of cell division that occurs in somatic cells, (such as skin cells, muscle cells etc) while meiosis occurs in gametes such as sperm and eggs.

116. A diploid living organism develops from zygote by which type of repeated cell division?

(a) Meiosis (b) Amitosis
(c) Mitosis (d) Segmentation

J&K CET-2005

Ans. (c) : Mitosis is a type of cell division that produces two daughter cells that are genetically identical to the parent cell. This type of cell division is used to grow and repair tissue in the body. It is also used to create gametes (sex cells) in sexually reproducing organisms.

• Meiosis is special kind of cell that reduces the chromosome number by half (1/2).

117. The drug colchicine has inhibitory effect on cell cycle in which stage ?

(a) Prophase (b) Anaphase
(c) Metaphase (d) Telophase

Punjab MET-2011

Ans. (c) : Colchicine has a inhibitory effect on cell cycle progression during the mitotic phase, specifically at the metaphase stage. Metaphase is the stage of mitosis where chromosomes align at the cell's equatorial plate, and the spindle fibers attach to the centromeres of the sister chromatids. Colchicine disrupts the formation of microtubules, which are essential for the proper alignment and separation of chromosomes during this stage. As a result, cell division is inhibited, and the cell cycle cannot proceed beyond metaphase.

118. L-shaped chromosomes are also called

(a) acrocentric (b) telocentric
(c) sub-metacentric (d) None of the above

Rajasthan PMT-2008

Ans. (c) : The location of centromere determines the classification of chromosomes.

Sub-metacentric chromosomes are those in which the centromere is present but not exactly in the middle of the chromosome. They form L' shaped structure.

119. Just after G_1 – phase

(a) G_2 – phase (b) M-phase
(c) S-phase (d) None of these

JCECE-2014

Ans. (c) : Correct equation of cell cycle is:-

$$G_1 \rightarrow S \rightarrow G_2 \rightarrow M$$

Just after G_1-phase occurs followed by S-phase or synthesis-phase. It is period during which DNA synthesis or replication takes place during and this time the amount of DNA per cell double.

120. Replication of centriole occurs during

(a) Interphase (b) Prophase
(c) Late prophase (d) Late telophase

BVP-2007

Ans. (a) : The replication of centrioles actually occurs during a specific stage of the cell cycle called the " S phase", which is part of the interphase. The cell cycle consists of several phase, including interphase and mitotic phase. Interphase is the period in the cell cycle when the cell is preparing for cell division. It is divided into three sub phases: G1, S and G2. During G1 and G2 phases, the cell grows, synthesizes proteins, and prepares for the next steps. The S phase is the critical phase where DNA replication takes place, including the replication of centrioles.

121. Which of the following does not occur in the interphase of eukaryotic cell division?

(a) Increase of ATP synthesis
(b) Increase of DNA synthesis
(c) Increase of RNA synthesis
(d) Reduction in cell size

WB JEE-2015

Ans. (d) : Reduction in cell size does not occure in the interphase of eukaryotic cell division. Interphase is known as the resting phase of cell cycle. Interphase is the time during which the cell prepares for division by undergoing both cell growth and DNA replication.

C. Cytokinesis

122. The process of cytokinesis shows the division of

(a) chromatids (b) cytoplasm
(c) nucleus (d) chromosomes

HP CET-2012 / VMMC-2004
Punjab MET-1999

Ans. (b) : The process of cytokinesis show the division of cytoplasm. Cell division ends as the cytoplasm divides into two by the process of cytokinesis. It can occurs along with or soon after nuclear division either by mitosis or meiosis.

• The chromatid is one of the two identical halves of chromosome that has been replicated in preparation for cell division.

• Nucleus controls and conducts all activities of a cell.

123. During mitosis nuclear membrane disappears at

(a) Early prophase (b) Late prophase
(c) Metaphase (d) Anaphase

Tripura JEE-2017
MGIMS Wardha-2011
AIPMT (Screening)-2010

Ans. (b) : In late prophase, the chromosome condensed and the nuclear membrane breaks down. This allows the chromosomes to interact with the spindle fibers and move to the metaphase plate. The nuclear membrane reforms in telophase, after the chromosomes have separated.

124. At which stage does cytokinesis begin?

(a) Anaphase (b) prophase
(c) Metaphase (d) Interphase

CG PMT-2010

Ans. (a) : Cytokinesis begins at the stage of anaphase. It separates a parental cell's cytoplasm into two daughter cells. Cytokinesis ends at the stage of telophase.

125. Highest number of antibiotics are produced by

(a) Bacillus (b) Penicillium
(c) Streptomyces (d) Cephalosporoum

BVP-2014

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Ans. (c) : Streptomyces is the genus of bacteria that produces the highest number of antibiosis. They are responsible for producing over two-thirds of the clinically useful antibiotics of natural origin.
Some of the most common antibiotics produced by streptomycin include penicillin, strepotomycin and neomycin.

126. Purified antibiotic penicillin of Pencillium notatum was discovered by
(a) Alexander Fleming (b) Howard Floxy
(c) Robert Hooke (d) Carolus Linnaeus
Punjab MET-2008
J&K CET-2001

Ans. (a) : Alexander Fleming was a Scottish bacteriologist who discovered penicillin in 1928. Penicillin is a natural antibiotic that is produced by the mold *Penicillium notatum*. It is a very effective antibiotic against a wide range of bacteria, including *Staphylococcus aureus* and *E.coli.*

D. Significance of Mitosis

127. During mitosis number of chromosomes gets
(a) change
(b) no change
(c) may be change if cell is mature
(d) may be change if cell is immature
BVP-2008
Uttarakhand PMT-2007
DUMET-2005
UP CPMT-2003

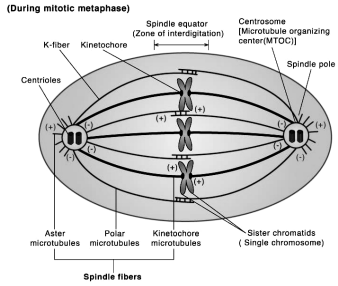
Ans. (b) : There is no change in chromosome number during mitosis but the DNA content per chromosome doubles during S-phase. Mitosis division is the process of cell division where chromosomes replicate and are equally distributed into two daughter cells. The chromosome number in each daughter cell is equal (no change) to that to the parent cell. e.g : diploid

128. Find the correct sub phase based on arrangement of chromosomes during M – phase
(a) Anaphase – Chromatin material in two poles
(b) Anaphase – Condensation of chromosomes
(c) Metaphase –Chromosomes lie at the equator
(d) Metaphase – Chromatids attached at the kinetochore
AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Chromosomes lies at the equator of the cell during metaphase which is second stage of mitosis.
• Prophase – Condensed and the nuclear envelope breaks down.
• Anaphase – Sister chromatids separate and move to opposite poles of the cell.
• Telophase – Decondense and the nuclear envelope reform.

129. Select the incorrect statement with reference to mitosis:
(a) Splitting of centromere occurs at anaphase
(b) All the chromosomes lie at the equator at metaphase
(c) Spindle fibres attach to centromere of chromosomes
(d) Chromosomes decondense at telophase
NEET-2022

Ans. (c) : Spindle fibres attach to the kinetochores of chromosomes.
• Kinetochores are the disc shaped structures present on sides of primary constriction or centromere of chromosome.



130. Which one of the following never occurs during mitotic cell division?
(a) Coiling and condensation of the chromatids
(b) Spindle fibres attach to kinetochores of chromosomes
(c) Movement of centrioles towards opposite poles
(d) Pairing of homologous chromosomes
NEET-2022

Ans. (d) : Mitotic cell is a type of cell division that have a nucleus.
• Mitosis cells use it to make more cells. During mitotic division coiling and condensation of the chromatids and spindle fibers attach to kinetochores of chromosomes and also movement of centriole towards opposite poles.
So pairing of homologous chromosome never occur mitotic cell division.

131. Significance of Mitosis includes the following, except _____
(a) Growth (b) Cell repair
(c) Diploid daughter cells (d) Genetic variation
AP EAMCET-05.10.2021 Shift-I

Ans. (d) : Mitosis assist in preserving the same number of chromosomes in daughter cells after division.
It is a fundamental process in the growth and repair of all living things and it plays a crucial role in the development, reproduction and maintenance of organisms.

132. The fruit fly has 8 chromosomes (2n) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase?
(a) 32 (b) 8
(c) 16 (d) 4
NEET-2021

Ans. (b) : In the S phase of cell cycle DNA replication occur. After replication the content of DNA gets doubled in S phase but there is no change in chromosome count. The number of chromosomes does not increases as DNA quantity does. Therefore, if the fruit fly G_1 phase chromosome count is 8, the S-phase chromosomal count will also be 8.

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133. Offsets are produced by

(a) Meiotic divisions (b) Mitotic divisions
(c) Parthenogenesis (d) Parthenocarpy

NEET-2018

Ans. (b) : Offsets is a part of plants or stem which is propagated by means of vegetative method.

- They are formed by mitosis in somatic cells.
- Each offset form when the meristem region of plant such as auxiliary buds or homologous structure.
- Offset are one internode long condensed rumors usually found in rosette plants.
- Offset daughter plants that are genetically identical to the parent.

134. Post mitotic gap phase is characterised by all, except

(a) Synthesis of RNA and nucleotides
(b) No change in DNA content
(c) Synthesis of histone proteins
(d) Growth phase of the cell

JIPMER-2017

Ans. (c) : In the cell cycle mitotic phase is that phase in which cell complete Prophase, Metaphase, Anaphase, Telephase. After mitotic phase cell enters in G_1 phase and S phase i.e these are called post mitotic phase. G_1 phase differentiate post mitotic & premitotic phase. It represents post mitotic gap. In post mitotic gap all process occurs except the synthesis of histone protein. The synthesis of histone protein occurs in S phase.

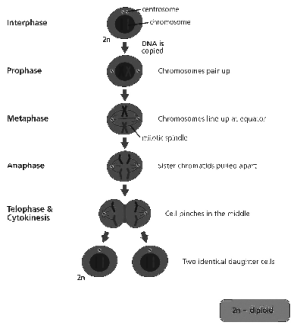
135. Which of the following options gives the correct sequence of events during mitosis?

(a) Condensation → nuclear membrane disassembly → crossing over → segregation → Telophase
(b) Condensation→nuclear membrane disassembly→arrangement at equator → centromere division→ segregation → Telophase
(c) Condensation → crossing over → nuclear membrane disassembly → segregation Telophase
(d) Condensation → arrangement at equator → centromere division → segregation → Telophase

NEET-2017

Ans. (b) : In mitosis, there are four phases prophase, metaphase, anaphase and telophase.

- In **Prophase** condensation of chromosomes occurs which is followed by nuclear membrane disintegration.
- **Metaphase** is characterised by arrangement of chromosomes on nuclear plate.
- In **Anaphase**, centromere division occurs, which aligned on opposite poles of the cell. The aligned chromosome are the segregated.
- In **Telophase**, chromosome moves to opposite poles and nuclear membrane reappear at each pole forming two daughter nuclei.



136. In mitotic cell division, the division of centromere and the division of chromatid occurs between:

(a) anaphase and telophase
(b) prophase and metaphase
(c) telophase and interphase
(d) anaphase and metaphase

WB JEE-2006

Ans. (d) : Anaphase is a mitotic cell division phase that comes after metaphase. Here the centromeres split and the chromatids separate and move to opposite poles.
Metaphase in this stage the microtubules start pulling the chromosome with equal force and the chromosome ends up in the middle of the cell.
Prophase is the first stage of mitosis. The completion of prophase is characterised by the initiation of the assembly of the mitotic spindle, the micro- tubules and the proteinaceous components of cytoplasm that help in the process
"Division of centromere followed by separation of sister chromatids is observed between anaphase and metaphase"

137. Mitosis occurs in:

(a) skin cells (b) heart cells
(c) kidney cells (d) all of these

Rajasthan PMT-2004

Ans. (d) : Mitosis is the process of cell division that produces two identical daughter cells. it occurs in all somatic cells, which are all the cells in the body that are not gametes (sex cells).

Difference b/w mitosis and meiosis

Feature	Mitosis	Meiosis
• Cell type	Somatic cells	Germ cells
• No. of daughter cells	2	4
• Chromosome number	Diploid (2n)	Haploid (n)
• Purpose	Growth repair and replacement of cells	Production of gametes

138. In mitosis, duplication of chromosomes occurs during:

(a) interphase (b) prophase
(c) metaphase (d) telophase

BHU PMT-2002

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Ans. (a) : In mitosis, the duplication of chromosomes occurs during the "S phase" of the cell cycle, which is part of interphase. The cell cycle consists of different phases, and interphase is the stage where the cell prepares for division by growing, replication its DNA, and synthesizing new organelles .

139. Mitosis is : (1) Reduction in chromosome number (2) Karyokinesis (3) Formation of four daughter nuclei (4)Cytokinesis

(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2005, 2008

Ans. (c) : Karyokinesis is the process of partition of cell nucleus during the M-phase of cell cycle formed two daughter nuclei.

• Cytokinesis is the cytoplasmic division of the cell at the end of cell division, bringing about the separation in to two daughter cells.

140. In which stage of mitosis chromosome arrange on equatorial plate?

(a) Prophase (b) Metaphase
(c) Anaphase (d) Telophase

UP CPMT-2012
BVP-2009

Ans. (b) : At the metaphase stage chromosome arranged of on equatorial plate.

The second stage of mitosis is known as metaphase during this stage, the spindle fibers start to connect to the compressed chromosomes.

The preparation for their segregation, the microtubules rearranged the chromosomes so that they appear in a line known as the metaphase plate.

141. Anastral mitosis is the characteristic of:

(a) lower animals (b) higher animals
(c) higher plants (d) all living organisms

JIPMER-2000, 1997

Ans. (c) : In anastral mitosis, the spindle fibers form without the help of centrioles. This different type of microtubule organizing center called the spindle pole body, similar to centrioles but not having the same structure.

142. Which one of the following is the significance of mitosis?

(a) Restricted to haploid cell
(b) Cell repair
(c) Increases the genetic variability
(d) Recombination of chromosomes
(d) Leads to evolution of new genotypes

Kerala PMT-2015

Ans. (b) : Mitosis is the process of cell division that produces two identical daughter cells. This process is essential for the growth and repair of tissues in the body. When a cell is damaged, it can undergo mitosis to replace the damaged cells.

143. How many mitotic divisions are needed for a single cell to make 128 cells?

(a) 7 (b) 14
(c) 28 (d) 32

VMMC-2002
Karnataka CET-2007

Ans. (a) : Mitotic division is a type of cell division in which one cell (the mother) divides to produce two new cells (daughter) that are genetically identical to itself.

The number of mitotic division needed for a single cell to make 128 cell can be calculated by the formula 2^n, where n is the number of mitotic divisions.

$\therefore 2^n = 128$

$2^n = 2^7$

$n = 7$

Therefore the number of mitotic division needed for a single cell to make 128 cell is 7.

144. The post mitotic phase of the cell in which active synthesis of RNA and proteins takes place is :

(a) S-phase (b) amitotic phase
(c) G_2-phase (d) G_1-phase

Karnataka CET-2003

Ans. (d) : The G_1 phase is the first phase of the interphase of the cell cycle. It is a post mitotic phase, meaning that it occurs after the cell has divided. During the G_1 phase, the cell grows in size and synthesis RNA and proteins. The is an preparation for the S phase, when the cell will replicate its DNA.

145. Germ cells in gonads are produced by

(a) only mitosis
(b) only meiosis
(c) maturation without cell division
(d) Both [a] and [b]

CG PMT-2011

Ans. (b) : Germ cells in gonads, which are responsible for producing eggs in females and sperm in males, are produced through both mitosis and meiosis.

146. Which of the following is not a characteristic feature during mitosis in somatic cells

(a) Synapsis
(b) Spindle fibres
(c) Disappearance of nucleolus
(d) Chromosome movement

NEET-2016 Phase-I

Ans. (a) : Synapsis is the pairing of homologous chromosomes that occurs during prophase I of meiosis. It is important step for crossing over to occur, which is a process that allow genetic material to the exchanged between homologous chromosomes. In mitosis, there is no need for crossing over, so synapsis does not occur.

147. The mitotic cell cycle is divided typically into four phases: G_1, S, G_2 and M. Considering a mitotic cycle time of 18 hrs; the distribution of period of time (in hrs) for each of these phases will be

	G_1	S	G_2	M
(a)	1	3	5	9
(b)	9	1	3	5
(c)	9	5	3	1
(d)	3	5	9	1

JIPMER-2015

Ans. (c) : The mitotic cell cycle is divided into four phases: G_1 , S, G_2 and M. The G_1 phase is the first phase and it is a period of growth and preparation for DNA replication. The S phase is the second phase, and it is

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when DNA replication occurs. The G_2 phase is the third phase, and it is a period of preparation for mitosis. The M phase is the fourth phase and it is when mitosis occurs.
The total time of the mitotic cell cycle is 18 H. The G_1 takes up 9H, S phase 5H, G_2 phase takes up 3H and the M phase takes up 1H..

148. Match the following pairs correctly:

Column–A		Column–B	
A.	**Statin**	**1.**	**Removal of oil stains**
B.	**Cyclosporin A**	**2.**	**Removal of clots from blood vessels**
C.	**Streptokinase**	**3.**	**Lowering of blood cholesterol**
D.	**Lipase**	**4.**	**Immuno-suppressive agent**

(a) A–2 B–3 C–1 D–4
(b) A–4 B–2 C–1 D–3
(c) A–4 B–1 C–2 D–3
(d) A–3 B–4 C–2 D–1

Assam CEE-2014

Ans. (d) : Statin – It is a group of medicine that can be lower blood cholesterol levels by blocking an enzyme in the liver that is necessary for making cholesterol.
Cyclosporin A – Cyclosporin is a calcine urin inhibitor, used as an immunosuppressant medication. It is taken orally or intrauenously for rheumatoid arthmitis.
Streptokinase–It is a thrombalytic medication activating plasminogen by non-enzymatic mechanism. As a medication it is used to break down the clots in some cases,
Lipase – It is an enzyme that breaks down triglyceriods into free fatty acids.

149. Where can we study mitosis?
(a) Brain (b) Legs
(c) Nail base (d) Kidney

CMC Vellore-2013

Ans. (c) : The cells in the nail base are called the cuticles. It is also named eponychium. The nail base is a good place to study mitosis because the cells in the nail base are living cells that are actively dividing. The cell in the nail base are also relatively large and the easy to see under a microscope.

150. Which one of the following preceeds reformation of the nuclear envelope during M phase of the cell cycle :-
(a) Transcription from chromosomes and reassembly of the nuclear lamina
(b) Formation of the contractile ring and formation of the phragmoplast
(c) Formation of the contractile ring and transcription from chromosomes
(d) Decondensation from chromosomes and reassembly of the nuclear lamina

AIPMT-2004

Ans. (d) : Telophase is the stage of the cell cycle. The nucleus is recognized by decondensation from the chromosomes and reassembly of the nuclear lamina before the nuclear membrane, which disappears during prophase and reappears in telophase is reconstituted.

151. Select the correct option :-

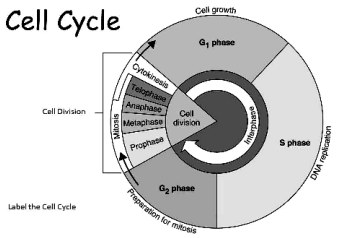
List-I		List-II	
(A)	**Synapsis aligns homologous chromosomes**	**(i)**	**Anaphase-II**
(B)	**Synthesis of RNA and protein**	**(ii)**	**Zygotene**
(C)	**Action of enzyme recombinase**	**(iii)**	**G_2-phase**
(D)	**Centromeres do not separate but chromatids move towards opposite poles**	**(iv)**	**Anaphase -I**
		(v)	**Pachytene**

	A	B	C	D
(a)	(ii)	(iii)	(v)	(iv)
(b)	(i)	(iii)	(v)	(iv)
(c)	(ii)	(iii)	(iv)	(v)
(d)	(ii)	(i)	(iii)	(iv)

AIPMT-2015

Ans. (a) : The zygotene stage of the prophase –I of meiosis-I. The pairing of two homologous chromosome occurs which is known as **synapsis**. After all synapsis formed a complex structure called **synaptonemal complex**. The homologous chromosome is called bivalent or a tetrad.

- **G2 phase-** of the cell cycle protein are synthesized for preparation of mitosis while cell growth continues.
- **Pachytene-** This stage is characterized by the appearance of recombination nodules. Crossing over is also an enzyme-mediated process and the enzyme involved is called **Recombinase**.
- **Anaphase-I-** Homologous chromosome separate chromatids move towards opposite poles. Centromeres do not separate and sister chromatids remain associated at their centromeres.
- **Anaphase-II-** This is the stage of meiosis-II which occur after metaphase-II when chromosome are in equatorial plate.



152. Centromere is a part of:
(a) ribosomes (b) mitochondria
(c) chromosome (d) endoplasmic reticulum

Haryana PMT-2001

Ans. (c) : The centromere which may be identified as a constrictive area of a chromosome, is important in helping the cell divided up its DNA during mitosis and meiosis. It is particular area where the spindle fibers of cell are attached.

@apna_pdf

153. Select the correct statement related to mitosis.

(a) Amount of DNA in the parent cell is first halved and then distributed into two daughter cells

(b) Amount of DNA in the parent cell is first doubled and then distributed into two daughter cells

(c) Amount of DNA in the parent cell is first halved and then distributed into four daughter cells

(d) Amount of DNA in the parent cell is first doubled and then distributed into four daughter cells

WB JEE-2014

Ans. (b) : In mitosis there are two daughter cells formed at the end of mitosis. The number of DNA in the parent cell is doubled in the S-phase of the interphase. During mitosis, it is equally distributed into two daughter cells, resuming the chromosome number of parent cell.

E. Meiosis

154. The longest phase of meiosis -I is:

(a) metaphase-I (b) prophase-I

(c) anaphase-I (d) telophase-I

BCECE-2014 / WB JEE-2011
JCECE-2005 / Punjab MET-2004
Haryana PMT-2002 / UP CPMT-2001
Manipal-2000 / AP EAMCET-1998

Ans. (b) : Prophase I is known as the longest phase of meiosis 1st. It is also called reductional division. It brings change in chromosome number from diploid to haploid.

Longest phase is prophase I- It is long and complete it divided into 5-stages.

1. **Leptotene-** Beaded long chromosomes
2. **Zygotene-** Chromosomes become shorter and thicker
3. **Pachytene-** Longest stage because it take time to cross over
4. **Diplotene-** Bivalent repel each other
5. **Diakinesis-** Terminalization occurs

155. The term Meiosis was given by :

(a) Johansen (b) Knoll and Ruska

(c) A. Fleming (d) Farmer and Moore

BVP-2005 / Haryana PMT-2004, 2000
JIPMER-2003 / Manipal-2003 / VMMC-2002

Ans. (d) : Term meiosis was given by Farmer and Moore (1905).

Johanson- Gave the term gene (1909).

Knoll and Ruska- Invented the first electron microscope (1931).

A. Fleming- He discovered the penicillin.

156. Pairing of homologous chromosomes takes place during

(a) leptotene (b) zygotene

(c) pachytene (d) diplotene

Haryana PMT-2005 / CG PMT-2004
BHU PMT-2003 / AP EAMCET-2000

Ans. (b) : Pairing of homologous chromosomes takes place during zygotene, where the homologous chromosomes comes into close contact and align themselves along their length. This process called synapsis. Once synapsis completed the homologous chromosomes are held together by protein called synaptonemal complex.

157. Meiosis can be observed in :

(a) tapetal cells (b) megaspores

(c) micropores (d) microspore mother cells

BCECE-2006 / VMMC-2005
AMU-2004 / BVP-2003

Ans. (d) : Meiosis is that type of cell division which reduces the number chromosome in gametes. The process of meiosis best seen in microspore mother cell which formed by the division of various stages in sporogenous tissue.

158. Match the following

	List-I		List-II
A.	Crossing over	I.	Diakinesis
B.	Synapsis	II.	Diplotene
C.	Weakening of synaptonemal complex	III.	Zygotene
D.	Terminalisation	IV.	Pachytene

(a) A – IV, B – III, C – II, D – I

(b) A – III, B – IV, C – II, D – I

(c) A – II, B – III, C – I, D – IV

(d) A – I, B – IV, C – II, D – III

TS EAMCET 10.05.2023 Shift-I

Ans. (a) :

A.	Crossing over	IV.	Pachytene
B.	Synapsis	III.	Zygotene
C.	Weakening of synaptonemal complex	II.	Diplotene
D.	Terminalisation	I.	Diakinesis

159. The reason for the genetic variation in the population of organisms

(a) Meiosis (b) Mitosis

(c) Cytokinesis (d) Karyokinesis

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : The main reason for the genetic variation in the population of organism is meiosis.

Meiosis is a reduction division, which means that the number of chromosome in the resulting cells is half the number of chromosomes in the original cell. The main reason of genetic variation is crossing over during meiosis.

160. Doubling of the number of chromosomes can be achieved by disrupting mitotic cell division soon after

(a) Prophase (b) Metaphase

(c) Anaphase (d) Telophase

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : All living organisms of the biological world start life as one cell i.e. unicellular zygote.

- During anaphase each pair of chromosomes is separated into identical, independent chromosomes and separated by mitotic spindle.
- Chromosome doubling may be carried out artificially with chemicals, such as colchicine oftain fertile plants from sterile hybrid.

@apna_pdf

161. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis?

(a) Diakinesis (b) Zygotene
(c) Pachytene (d) Diplotene

NEET (UG) 07.05.2023

Ans. (c) : Pachytene is the third stage of meiosis prophase-I

- Meiosis is the process in eukaryotic sexually reproducing animals that reduces the number of chromosomes in a cell before reproduction.
- Contraction of chromosomes is continuous. Pachytene stage begins just when the synapsis has completed. The paired chromosomes structures are called bivalents. If there are more than two homologous in paired condition they are called multivalents.

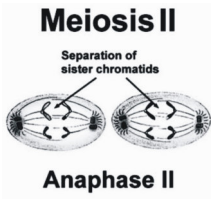
162. Which of the following stages of meiosis involves division of centrornere?

(a) Telophase (b) Metaphase I
(c) Metaphase II (d) Anaphase II

NEET (UG) 07.05.2023

Ans. (d) : In anaphase II two sister chromosome of each pair start to move towards the opposite poles of the spindle, they are being drawn towards the opposite pole by their centromeres

- Anaphase II is the third stage of meiosis II.
- It occurs after metaphase II when the chromosome are in the equatorial plane. The spindle fibers are connected to the kinetochores.



163. During Meiosis I, in which stage synapsis takes place?

(a) Leptotene (b) Pachytene
(c) Zygotene (d) Diplotene

NEET-2020 Phase-II
NEET (Karnataka)-2013

Ans. (c) : In zygotene, the pairing of homologous chromosome starts a process known as chromosomal synapsis, A pair of synapsis homologous chromosome forms a complex known as bivalent or tetrad called synaptonemal complex.

- At pachytene stage, crossing over of non-sister chromatids of homologous chromosomes occurs at the recombination nodules. The chromosome remains linked at the sites of crossing over.
- Diplotene marks the dissolution of the synaptonemal complex and separation of the homologous chromosome of the bivalents except at the sites of cross-over. The x-shaped structures formed during separation are known as chiasmata.

164. Match the following

List–I		List–II		List–III
(A) Interphase	(i)	Synapsed homologous Chromosomes	(I)	Two sequential cycles
(B) Meiosis	(ii)	Crossing over	(II)	Exchange of genetic material
(C) Bivalant	(iii)	Single cycle of DNA Replication	(III)	95% of cell cycle duration
(D) Recombi-nase	(iv)	Between two M-phases	(IV)	Zygotene

The correct answer is

	(A)	(B)	(C)	(D)
(a)	iv, III	iii, I	i, IV	ii, II
(b)	iv, III	i, I	ii, II	iii, IV
(c)	iii, III	i, II	ii, I	iv, IV
(d)	iv, III	i, II	ii, IV	iii, I

AP EAMCET-25.04.2018 Shift-II

Ans. (d) : (A) Interphase — Between to M–Phases — 95% of cell cycle duration.
(B) Meiosis — Single cycle of DNA replication— Two sequential cycles.
(C) Bivalant — Synapsed homologous chromosome — Zygotene.
(D) Recombinase – crossing over —— Exchange of genetic material.

165. The importance of meiosis lies in:

(a) bringing discontinuous variations
(b) addition in the number of chromosomes
(c) reduction in the number of chromosomes
(d) maintaining the number of chromosomes

WB JEE-2006

Ans. (d) : Meiosis discovered by Farmer and Moore. Meiosis is a special kind of cell division that reduces the chromosome number by half which results in the production of haploid daughter cells. The production of haploid phase in the life cycle of sexually reproducing organism where fertilization restores the diploid phase. It maintains chromosome number generation after generation.

166. Root cells of wheat has 2n = 42 chromosomes. Which one of the following is the basic chromosome number of wheat?

(a) 42 (b) 21
(c) 7 (d) 14

WB JEE-2010

Ans. (c) : According to question wheat species is hexaploid i.e. means

$6n = 42$

$n = 7$

Ploidy level of an organism shows the number of complete basic chromosomes set. It has 6-basic set of chromosome.

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167. In meiosis division is:
(a) I[st] reductional and IInd equational
(b) I[st] equational and IInd reductional
(c) both reductional
(d) both equational

Haryana PMT-2005
JIPMER-2005
BHU PMT-2003

Ans. (a) : Meiosis division occur in two stages
Meiosis I- It is called the reductional division also called heterotypic division because it brings change from diploid to haploid stage (2n – n).
Meiosis II- It is called equational division also called homotypic division means for maintaining haploid number (n).

168. Synapsis occur between
(a) a male and female gamete
(b) mRNA and ribosomes
(c) spindle fibres and centromere
(d) two homologous chromosomes

Manipal-2012

Ans. (d) : Synapsis is the pairing of homologous chromosome by crossing over. It takes place during at the zygotene stage of meiosis. It is the exchange of chromosomal segment after synapsis which causes the genetic recombination i.e. pairing of chromosomes occurs and bivaleuts form synaptonemal complexes.

169. Identify the correctly matched pair (s).
(1) Chromonema - A localized condensed region of chromosome
(2) Non-disjunction - The failure of chromosomes to be separated during meiosis or mitosis
(3) Master and slave - Polytene chromosome hypothesis
(4) Chromocentre - Lampbrush chromosome
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2009

Ans. (b) :
- Chromonema – A localized condensed region of chromosome.
- Non disjunction – The failure of chromosomes to be separated during meiosis or mitosis.
- Master and slave – Lampbrush chromosome.
- Chromocentre – Polytene chromosome hypothesis.

170. At which phase of meiosis, the two cells, each with separated sister chromatids move towards opposite poles:
(a) metaphase I (b) metaphase II
(c) anaphase I (d) anaphase II

Punjab MET-2004
Manipal-2000

Ans. (d) : There are two division occur in the process of meiosis.
Meiosis I- Reductional division – The separation of homologous chromosome occur.
Meiosis II- Equational division – Daughter cell have same number of chromosome as the parent cell enter in meiosis II. In this division centromere of chromosome splits, sister chromatid move towards opposite pole during Anaphase II.

171. The four daughter cells derived from a single meiosis differ from each other due to
(a) difference in chromosome number
(b) crossing over only
(c) independent assortment of chromosomes
(d) crossing over as well as independent assortment of chromosomes

CG PMT-2007

Ans. (d) : A - haploid daughter cells which are formed as a result of it meiosis will differ from each other. It involves pairing of homologous chromosomes and recombination between them. It provides opportunities for new combination of genes to occur in the gametes by two-ways independent assortment of chromosomes and crossing over.

172. Tapetal cells are characterized by
(a) mitotic division
(b) meiotic division
(c) endomitosis
(d) endomitosis as well as endopolyploidy.

Haryana PMT-2007

Ans. (d) : The deepest layer of anther wall is called the tapetum it is the primary nourishing layer. Endomitosis and endopolyploidy cause its cells to become multinucleate and polyploid.

173. The second meiotic division leads to :
(a) separation of sex chromosomes
(b) fresh DNA synthesis
(c) separation of chromatids and centromere
(d) separation of homologous chromosomes

Haryana PMT-2004
Manipal-2003

Ans. (c) : The second meiotic or meiosis division lead to separation of chromatics and centromere at the anaphase-II.
In anaphase-II- centromere split and chromatids separate and chromatic move to opposite poles two group of chromosomes (total four group) are produce and end of telophase-II 4 haploid nuclei is form.

174. Among the following which one is longest phase in prophase of meiosis?
(a) Leptotene (b) Zygotene
(c) Pachytene (d) Diplotene

AMU-2005 / Haryana PMT-2004 / Manipal-2003

Ans. (d) : Prophase of first meiotic division is typically longer and more complex and prophase divided into five part leptotene, zygotene, pachytene, diplotene and diakinesis .
- Diplotene is longest phase in some oocytes of vertebrates diplotene can last for months or years.

175. Variations appear during meiosis due to
(1) independent assortment
(2) crossing over
(3) linkage
(4) glycolysis

@apna_pdf

Select the correct code-

(a) 1, 2 and 3 are correct. (b) 1 and 2 are correct.
(c) 2 and 4 are correct. (d) 1 and 3 are correct.

BHU PMT (Mains)-2008, 2005

Ans. (b) : Independent assortment and crossing over are the two process that shuffle the genetic material during meiosis resulting in a wide variety of genetic combination in the offspring. This is essential for sexual reproduction as it is follows for the production of offspring with different traits than the parents.

176. Crossing over takes place at:

(a) one strand stage (b) two strand stage
(c) three strand stage (d) four strand stage

Punjab MET-2009 / Rajasthan PMT-2009
Haryana PMT-2003

Ans. (d) Crossing over takes place at the four strand stage of meiosis, also known as the pachytene stage. This is the stage where the homologous chromosomes are loosely paired and aligned, and the DNA is double stranded. Crossing over occurs when two non-sister chromatids exchange genetic material.

177. In oogenesis when a diploid cell in the ovary undergoes meiosis, how many ova results?

(a) 1 (b) 2
(c) 3 (d) 4

CG PMT-2010

Ans. (a) : Oogenesis is the process of egg production in females. It begins with a diploid cell in the ovary, called an Oogonium. The Oogonium undergoes two rounds of meiosis, resulting in four haploid cells. However, only one of these cells, called the secondary oocyte will mature into an ovum. The other three cells are called polar bodies and they degenerated.

178. Arrange the following events of meiosis in the correct sequence:

1. Terminalization
2. Crossing over
3. Synapsis
4. Disjunction sequences is:

(a) 4, 3, 2, 1 (b) 3, 2, 1, 4
(c) 2, 1, 4, 3 (d) 1, 4, 3, 2

AP EAMCET-2005

Ans. (b) : The pairing of homologous chromosomes take place during zygotene stage this is known as synapsis. In the next stage i.e. pachytene stage the exchange of some genes (part of chromatides) take place between two non-sister chromatid of a pair of homologous chromosome. In the last stage of prophage-I i.e. diakinesis is the process of terminalization i.e. movement of chiasmata (site of crossing over) towards the telomere of the chromosome take place. In the anaphase-I stage of meiosis-I. The process of disjunction of genome i.e. movement of sister chromatids of a pair of homologue towards opposite pole take place.

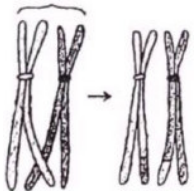
179. What is the function of the enzyme 'recombinase' during meiosis?

(a) Formation of synaptonemal complex
(b) Crossing over between non-sister chromatids
(c) Condensation of chromosomes
(d) Alignment of bivalent chromosomes on equatorial plane

Karnataka CET-2016

Ans. (b) : Recombinase is an enzyme that catalyzes crossing over between non-sister chromatids during meiosis. This process is essential for generating genetic diversity in the offspring.

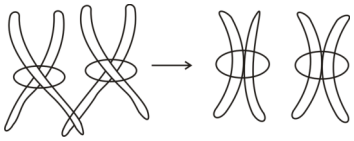
180. Given below is the representation of a certain event at a particular stage of a type of cell division. Which is this stage?



(a) Prophase of Mitosis
(b) Both prophase and metaphase of mitosis
(c) Prophase I during meiosis
(d) Prophase II during meiosis

AIPMT (Screening)-2012

Ans. (c) :



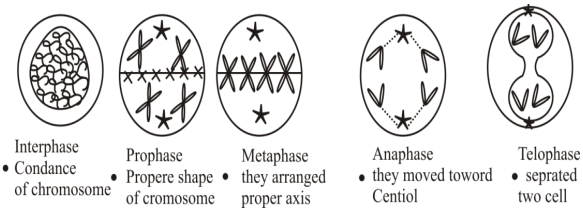
The figure represents crossing over between bivalent of non sister chromatids of homologous chromosomes occurred during pachytene stage prophase-I of meiotic cycle. Prophase-I marks the beginning of chromosome condensation where duplicated chromosome attached with sister chromatids are initially seen as long thin threads.

181. Select the correct option with respect to mitosis.

(a) Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase
(b) Chromatids separate but remain in the centre of the cell in anaphase
(c) Chromatids start moving towards opposite poles in telophase
(d) Golgi complex and endoplasmic reticulum are still visible at the end of prophase

AIPMT (Screening)-2011

Ans. (a) : During the mitosis – four phase – Prophase, Metaphase, Anaphase, Telophase.



Mitosis is the process by which a single cell is divided into two identical daughter cells by the process of cell division. Mitosis is also referred to as the repairment and regeneration of body structures like in starfish. In many organisms, mitosis is the method of asexual reproduction. The character of metaphase is spindle fibers attach to kinetochores of chromosomes.

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182. The behaviour of the chromosomes was parallel to the behaviour of genes during meiosis was noted by
(a) Correns (b) Tschermark
(c) Sutton and Boveri (d) De Vries
(e) Henking

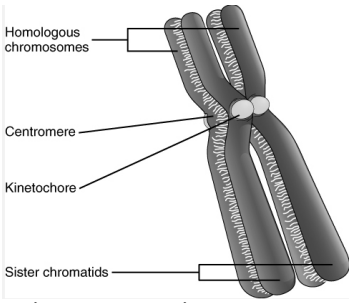
Kerala PMT-2012

Ans. (c) : Sutton & Boveri – Chromosomal theory of inheritance was proposed by-Sutton and Boveri in 1902. Similarties in the behavior of chromosomes & genes are occur in pairs.
Hugo De Vries (1901-03) – Dutch botanist and geneticist was given by mutation theory.
Henking – German cytologist who discovered the 'X' chromosome in 1890.

183. The enzyme recombinase is required at which stage of meiosis.
(a) Pachytene (b) Zygotene
(c) Diplotene (d) Diakinesis

AIPMT-2014

Ans.(a):



Crossing over is an enzymatic process occurring during the **pachytene state of prophase** I. It is an enzyme that catalyzes the cutting and rejoining of DNA. This process cuts one strand of DNA at a time and then joins them with another piece of DNA that has been cut from a different parent molecule. It is the point in meiosis when the homologous chromosomes have completely synapsed and are now called bivalents. The bivalents are held together by a series of proteins that form a structure called the synaptonemal complex.

184. The complex formed by a pair of synapsed homologous chromosomes is called :
(a) Axoneme (b) Equatorial plate
(c) Kinetochore (d) Bivalent

NEET-2013

Ans. (d) : The complex formed by a pair of synapsed homologous chromosomes is called a bivalent. A bivalent is made up of two homologous chromosomes that are held together by a synaptonemal complex.

185. Meiosis occurs in:
(a) somatic cells only (b) germ cells only
(c) both (a) and (b) (d) none of the above

J&K CET-2001

Ans. (b) : Meiosis occurs in germ cells only. Somatic cells are the cells that make up the body of an organism. germ cells that give rise to gametes. Meiosis is the process that produces gametes from germ cells.

186. Crossing over occurs during
(a) leptotene (b) diplotene
(c) pachytene (d) zygotene

BVP-2009

Ans. (c) : Pachytene - The pair of chromosomes becomes twisted cannot be distinguished separately. As a consequence of synapsis the number of observable chromosome is half of somatic chromosome number. Crossing over take place in this phase.
Zygotene – Chromosomes become shorter and thicker.
Diplotene – Bivalents repel each other. Chiasmata (sites of crossing over)

187. Chiasma shows the sites of
(a) spindle formation (b) synapsis
(c) crossing over (d) none of these

VMMC-2004

Ans. (c) : Chiasma shows the site of crossing over. The homologus chromosomes start moving away from each other. During the separation of homologus chromosomes of each bivalent. It is found that the chromosomes are attached with each other at one or more point. This attachment is known as chiasma.

188. Colchicine is an inhibitory chemical, which:
(a) prevents the spindle formation in mitosis
(b) prevents the formation of equatorial plane
(c) stops the functioning of centriole
(d) prevents attaching of centromeres with rays

Haryana PMT-2000

Ans. (a) : Colchicine is an inhibitory chemical that prevents the spindle formation in mitosis.
Colchicines is used to prevent gout attacks sudden severe pain in one or more joints caused by abnormally high level of a substance called uric acid.

189. Which one of the following is wrong for meiosis?
(a) It leads to formation of sister chromatids
(b) It occurs in diploid cell
(c) It occurs in haploid cell
(d) It occurs by splitting of centromeres and separation of sister chromatids

WB JEE-2015

Ans. (c) : Meiosis occurs in a diploid organisms, not haploid. Haploid organisms already have a single set of chromosomes, making meiosis unnecessary for their reproduction. Diploid cells reproduce by mitosis making daughter cells that are exact replicas.

190. The formation of multivalents at meiosis in diploid organism is due to
(a) monosomy
(b) inversion
(c) deletion
(d) reciprocal translocation

Punjab MET-2010

Ans. (d) : The formation of multivalents at meiosis in diploid organism caused by the reciprocal translocation.
Monosomy – Monosomy takes place when a missing number of a chromosome. Instead of 46-chromosome, the person has only 45-chromosomes. It occurs in a syndrome known as turner syndrome.
Deletion – It is a type of mutation that involves the loss of one or more nucleotide from a segment of DNA.

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F. Phase of Meiosis and its Significance

191. When synapsis is complete all along the chromosome, the cell is said to have entered a stage called

(a) zygotene (b) pachytene
(c) diplotene (d) diakinesis

CMC Vellore-2012
CMC Ludhiana-2009
JCECE-2009 / AFMC-2008 / AIIMS-2005

Ans. (b) : When synapsis is completed , the cell entered a stage called pachytene. During this stage bivalent chromosomes now clearly appears as tetrads. In this stage recombination between homologous chromosomes is completed by the end of pachytene, leaving the chromosomes linked at the sites of crossing over.

192. In which of the following stage, the chromosome is single thin and like long thread?

(a) Leptotene (b) Zygotene
(c) Pachytene (d) Diakinesis

MP PMT-2011 / AMU-2012,2007
Manipal-2001 / DUMET-2001
AFMC-1997

Ans. (a) : Leptotene is stage in the prophase-I of meiosis . In this stage chromosome appears thin and long. The leptotene stage is also known as the bouquet stage due to the specific alignment of chromosomes in the nucleus .

193. Crossing over occurs during

(a) Leptotene (b) Diplotene
(c) Pachytene (d) Zygotene

VMMC-2009
BHU PMT (Screening)-2009
Uttarakhand PMT-2009
MGIMS Wardha-2008

Ans. (c) : Crossing over occurs during pachytene stage between non-sister chromatids of a pair of homologous chromosomes. During pachytene, stage one chromatid of each homologous overlaps. Non-sister chromatids in each bivalent exchange their segments during pachytene. Diplotene is characterised by appearance of chiasma marking the locations at which crossing over has already occurred in the pachytene stage.

194. Synaptonemal complex occurs in

(a) leptotene (b) zygotene
(c) pachytene (d) diakinesis

Tripura JEE-2018
BCECE-2012
UP CPMT-2010
Rajasthan PMT-1998

Ans. (b) : Synaptonemal complex occurs during second stage of prophase of first meiotic division called zygotene. During this stage chromosome start paring together any this process of association is called synapsis such paired chromosomes are called homologous chromosomes. The complex formed by a pair of synapsed homologous chromosomes is called a bivalent or a tetrad.

195. The complex formed by a pair of synapsed homologous chromosomes is called,

(a) Univalent
(b) Pentavalent
(c) Triad
(d) Bivalent

Karnataka CET-20.05.2023

Ans. (d) : A bivalent is a pair of synapsed homologous chromosomes. It is formed during prophase-I of meiosis. The homologous chromosome are held together by chiasma.

196. When pollen mother cell of Apple plant undergoes meiotic division, number of chromatids present in Anaphase I, Anaphase II and the number of bivalents respectively are

(a) 34, 34, 34 (b) 34, 17, 17
(c) 34, 17, 34 (d) 17, 17, 34

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : The pollen mother cell of an apple plant has 34 chromosomes. In Anaphase-I, the homologous chromosome are separated but the sister chromatids remain attached. So there are still 34 chromatids present, but they are arranged in 17 pairs of bivalents. In Anaphase-II, the sister chromatids of each chromosome separate and move to opposite poles of the cell, so there are 17 chromatids present in Anaphase-II.

197. Assertion (A) : Suitable stage to observe chromosome is metaphase
Reason (R) : In metaphase chromosomes are scattered in cytoplasm
The correct option among the following is

(a) (A) and (R) are true. (R) is the correct explanation for (A)
(b) (A) and (R) are true, (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET 10.05.2023 Shift-I

Ans. (c) : • The chromosomes are arranged in a single line along the equator of the cell in metaphase, where they observed easily.
• In metaphase, the chromosomes are not scattered in the cytoplasm, but they are attached to the spindle fibers at their centromeres.

198. Identify the correct sequence of events during prophase I of meiosis:

(i) Synapsis of homologous chromosomes
(ii) Chromosomes become gradually visible under microscope
(iii) Crossing over between non-sister chromatids of homologous chromosomes
(iv) Terminalisation of chiasmata
(v) Dissolution of synaptonemal complex
Choose the correct answer from the options given below:

(a) (i), (ii), (iii), (iv), (v)
(b) (ii), (iii), (iv), (v), (i)
(c) (ii), (i), (iii), (v), (iv)
(d) (i), (iii), (iv), (v), (ii)

NEET (Re-Exam)-04.09.2022

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Ans. (c) : The correct sequence of event during prophase I of meiosis is-

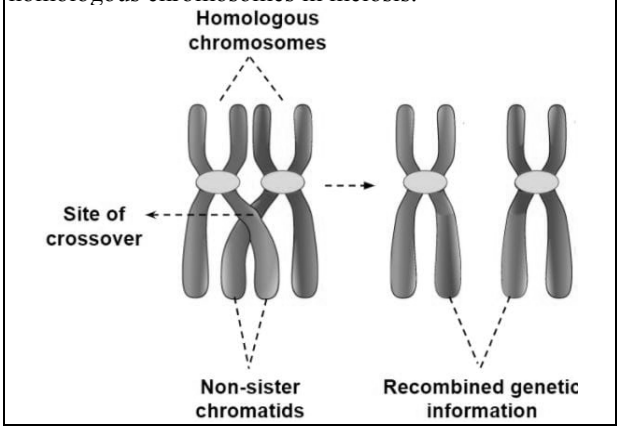
1. **Leptolene-** The chromosomes condense and become visible under microscope.
2. **Zygotene-** The homologous chromosomes pairs up and align next to each other.
3. **Pachytene-** The homologous chromosomes exchange genetic material through crossing over.
4. **Diplotene-** The synaptonemal complex dissolves and the chiasmata, the X-shaped structures that form at the point where the homologous chromosomes have exchanged genetic material.
5. **Diakinesis-** The chromosomes fully condensed and the spindle fibres begin to form.

199. In meiosis, crossing over and exchange of genetic material between homologous chromosomes are catalyzed by the enzyme:

(a) Phosphorylase (b) Recombinase
(c) Transferase (d) Polymerase

NEET (Re-Exam)-04.09.2022

Ans. (b) : Recombinase is the enzyme that catalyzes crossing over and exchange of genetic material between homologous chromosomes in meiosis.



200. Statement 1: Desynapsy ends at the diakinesis
Statement 2: Diakinesis is characterized by the terminilisation

(a) Statement 1 is false, statement 2 is true
(b) Statement 1 and statement 2 are true
(c) Statement 1 is true and statement 2 is false
(d) Both statements are false

AP EAMCET-11.07.2022 Shift-II

Ans. (b) : Diakinesis is the last stage of meiosis prophase-I. This stage is characterized by chiasmata terminalisation. After diakinesis, the dividing cell enters metaphase. At this stage, divalent distributes them evenly in the nucleus.

201. Match the following lists :

List-I	List-II
A) Anaphase I	**I) Diad of a cell is formed**
B) Telophase I	**II) Haploid daughter cells are formed**
C) Anaphase II	**III) Homologous chromosomes get separated**
D) Telophase II	**IV) Splitting of centromere in the chromosome**

The correct match is:

	A	B	C	D
(a)	III	I	II	IV
(b)	III	I	IV	II
(c)	III	IV	I	II
(d)	III	II	I	IV

TS EAMCET-30.07.2022 Shift-II

Ans. (b) :

Anaphase I	-	Homolagous chromosomes get separated
Telephase I	-	Diad of a cell is formed.
Anaphase II	-	Spliting of centromere in the chromosome.
Telophase II	-	Haploid daughter cells are formed.

202. The correct sequence of events in prophase I is

(a) Synapsis → Crossing over → Chiasmata → Terminalisation
(b) Crossing over → Synapsis → Chiasmata → Terminalisation
(c) Chiasmata → Synapsis → Crossing over → Terminalisation
(d) Chiasmata → Crossing over → Synapsis → Terminalisation

Karnataka CET-2021

Ans. (a) : Synapsis – In Zygotene stage the homologous chromosomes pairs, the process is called chromosomal synapsis.
Crossing over – In pachytene stage the crossing over of non-sister chromatids in homologous chromosomes takes place.
Chiasmata – In Diplotene stage the formation of X-shaped compositions takes place at the time of separation called chiasmata.
Terminalization – The displacement of chiasmata is termed as terminalization after crossing over in diakinesis.

203. Identify the correct sequence of the following sub-phase of prophase I.

(I) Zygotene (II) Diplotene
(III) Leptotene (IV) Pachytene
(V) Diakinesis

(a) I, II, III, IV, V (b) I, II, III, V, IV
(c) III, I, IV, II, V (d) III, I, IV, V, II

TS EAMCET-29.09.2020 Shift-II

Ans. (c) : Leptotene → Zygotene → pachytene → Diplotene → Diakinesis.
Leptotene:- Long chromosomes beadead, chromosomes shows bouquet arrangement.
Zygotene:- Chromosomes becomes shorter and thicker synapsis pairing of chromosomes occurs.
Bivalents forms synaptonemal complexes.
Pachytene:- longest stage because it takes time to crossing over.
Diplotene:- Bivalent each other repel.
Diakinesis:- Nuclear membrane disappears, centrioles migrate to poles and spindle fibres begin to form.

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204. Identify the event in meiosis mediated by the enzyme recombinase

(a) Synaptic pairing (b) Terminalization
(c) Crossing Over (d) Interkinesis

Karnataka CET-2020

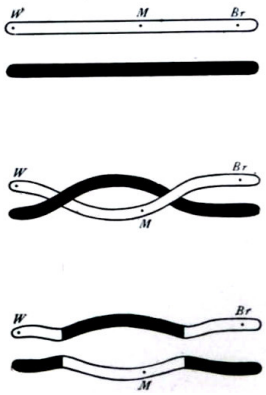
Ans. (c) : Crossing over is a process which occurs in pachytene stage of prophase-I of meiosis-I during cell division. Recombinase enzyme mediated in crossing over, between non-sister chromatics of chromosome.This process is facilitated by an enzyme called recombinase.

205. Crossing over takes place between which chromatids and in which stage of the cell cycle?

(a) Non-sister chromatids of non-homologous chromosomes at Pachytene stage of prophase I
(b) Non-sister chromatids of non-homologous chromosomes at Zygotene stage of prophase I
(c) Non-sister chromatids of homologous chromosomes at Pachytene stage of prophase I
(d) Non-sister chromatids of homologous chromosomes at Zygotene stage of prophase I

NEET (Odisha)-2019

Ans. (c) :



Scheme to illustrate double crossing over

• Crossing over takes place between non-sister chromatids of homologous chromosomes at the pachytene stage of prophase. I. During prophase I of meiosis, the homologous chromosomes pair up and form a structure called a bivalent.

206. After meiosis I, the resultant daughter cells have

(a) Four times the amount of DNA in comparison to haploid gamete.
(b) Same amount of DNA as in the parent cell in S phase.
(c) Twice the amount of DNA in comparison to haploid gamete.
(d) Same amount of DNA in comparison to haploid gamete.

NEET (Odisha)-2019

Ans. (c) : Meiosis-I is a reductional division, which means that the resultant cell will have half the number of chromosomes as diploid parent cells. Meiosis is a specialized form of cell division that produces reproductive cells such as plants, fungal spores, sperm and egg cells. The overall process of meiosis produces four daughter cells is haploid because it has half the number of chromosomes as the original parent cell.

• After meiosis-II, daughter cells will contain half the number of chromosomes and half of the amount of DNA is comparison to the parent cell.

207. The chromosomes align at the equator and the microtubules' from opposite poles of the spindle get attached to the kinetochores of sister chromatids are in

(a) Metaphase-I (b) Telophase-I
(c) Metaphase-II (d) Telophase-II

TS EAMCET-09.05.2019 Shift-I

Ans. (c) : Metaphase II– During Metaphase spindle fibers attach to the centromere of each pair of sister chromatids. The sister chromatids line up at the equator or center of the cell. This is also known as the metaphase plate. Metaphase is a stage during the process of cell division occur.

208. In meiosis two homologous chromosomes form bivalents by

(a) synaptonemal complex
(b) Golgi complex
(c) Complex medium
(d) Initiation complex

Tripura JEE-2019

Ans. (a) : Synaptonemal complex is that stage which indicates that chromosome synapsis, The synaptonemal complex form during the early stage of meiotic prophase-I. It is a ladder like complex that hold the two homologous chromosomes together. The pair of synapsed homologous chromosomes is called a bivalent or tetrad.

209. Non-disjunction in meiosis results in

(a) trisomy (b) normal diploid
(c) gene mutation (d) None of these

JIPMER-2018

Ans. (a) Non disjunction in meiosis is the failure of homologous chromosome or sister chromatids to separate properly during meiosis. This can result in the production of gametes with an abnormal number of chromosomes, such as trisomy(having three copy of chromosome instead of the usual two)

210. In biogas plant, the role of acidogenic bacteria is to

(a) Convert monomers to organic acids
(b) Convert monomers to complex polymers
(c) Transform acetic acid to biogas
(d) Digest fungi in the sludge

MHT CET-2018

Ans. (a) : Acidogenic bacteria breakdown complex organic matter into monomers, These organic acids are then used by bacteria in the biogas plant to produce methane, which is the main component of biogas.

211. Number of bivalents, chromatid tetrads, DNA strands, telomers present in pachytene phase of meiocyte of Maize

(a) 20, 20, 80, 80 (b) 20, 20, 40, 80
(c) 10, 10, 40, 80 (d) 10, 20, 40, 40

AP EAMCET-25.04.2018 Shift-I

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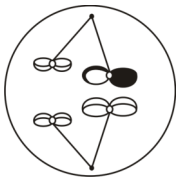
Ans. (b) : The no. of bivalents, chromatid tetrads. DNA strands, and telomeres present in the pachytene phase of a meiocyte of maize is 20, 20, 40 and 80 respectively.

212.



Above diagram represents

(a) metaphase-I (b) anaphase-I
(c) metaphase-II (d) anaphase-II

JIPMER-2018

Ans. (a) : Metaphase - I is marked by the breakdown of the nuclear membrane and the attachment of kinetochore microtubules to the bivalent. Homologus pair moves together along the metaphase plate.

213.

Above diagram represents

(a) anaphase-I (b) metaphase-I
(c) telophase-I (d) prophase-I

JIPMER-2018

Ans. (a) : Anaphase - I homologus chromosomes are separated. In this phase, sister chromatids stay together. Homologus chromosomes separated and move to opposite poles.

214. The stage during which separation of the paired homologous chromosomes begins is

(a) Pachytene (b) Diplotene
(c) Zygotene (d) Diakinesis

NEET-2018

Ans. (b) : During diplotene the homologous chromosome develops a repulsive force and begins to separate from each other. Terminalization begins at diplotene stage i.e. chiasmata start to shift towards end. The separation of homologous chromosome and dissolution of synaptonemal complex occur at diplotene stage.In zygotene phase function of synapsis occur. During the pachytene crossing over between non-sister chromatid of homologous chromosome. Diakinesis marked by terminalization or chiasmata.

Phase of meosis : Leptotene → Zygotene → Pachytene → Diplotene → Diakinesis

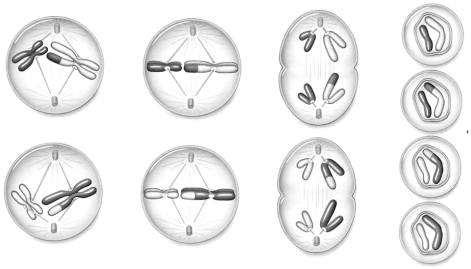
215. Indentify the correct matched pair.

(a) Segregation-Metaphase II
(b) Significance of meiosis-Production of genetically similar cells
(c) Exchange of genetic material-Diakinesis
(d) Anaphase II of meiosis-Centromeric division

AIIMS-2017

Ans. (d) : In anaphase II of meiotic division, the centromeres divide. This division results in the movement of two separated chromatids of chromosomes towards opposite poles.
Anaphase-II involves separation of the sister chromatids.

Meiosis II - Stages



216. Anaphase promoting complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, which of the following is expected to occur?

(a) Chromosomes will not condense
(b) Chromosomes will be fragmented
(c) Chromosomes will not segregate
(d) Recombination of chromosome arms will occur

NEET-2017

Ans. (c) : The APC is a protein degradation machinery that is necessary for proper mitosis of animal cells. It degrades proteins that are involved in mitosis, such as cyclins and securing. It the APC is defective, then these proteins will not be able to proceed properly and the chromosomes will not segregate properly. This can lead to a number of problems, including-

- Cell death.
- Chromosomal abnormalities.
- Cancer.

217. Synapsis is characteristic feature of

(a) Leptotene (b) Zygotene
(c) pachytene (d) Diplotene

VMMC-2011

Ans. (b) : It is a characteristic features seen in the process of meiosis during formation of male and female gametes. The pairing of homologous chromosome during meiosis is referred to as synapsis. Synapsis is found in the zygotene stages of prophase-I in meiosis.

218. Formation of chiasmata is the characteristic feature of

(a) diplotene (b) pachytene
(c) zygotene (d) diakinesis

Himachal Pradesh PMT-2011
UP CPMT-2010,2004

Ans. (a) : Formation of chiasmata is occurs during the stage of deplotene of prophase-I. In this stage the crossing over is completed. Chiasmata is formed at the sites of crossover. These X-shaped structures are called chiasmata .

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219. Meiosis-II performs
(a) Synthesis of DNA and centromere
(b) Separation of sex-chromosomes
(c) Separation of homologous chromosomes
(d) Separation of chromatids

VMMC-2013

Ans. (d) : Meiosis-II is initiated immediately after cytokinesis, usually before the chromosomes have fully elongated. In contrast to meiosis-I, meiosis-II resembles a normal mitosis. During meiosis-II in anaphase-II, the sister chromatids of the homologous pair separated and allowing them to move toward opposite poles of the cells.

220. Stages in proper sequence of prophase-I are
(a) zygotene, leptotene, pachytene, diakinesis
(b) leptotene, zygotene, pachytene, diplotene and diakinesis
(c) leptotene, pachyiene, zygotene, diakinesis and diplotene
(d) diplotene, diakinesis, pachytene, zygotene and leptotene

MGIMS Wardha-2007

Ans. (b) : Prophase of the first meiotic division is typically longer and more complex when compared to prophase of mitosis. It has been further sub divided into the following five phases base chromosomal behaviors. The proper sequences of prophase-I are Leptotene, zygotene, pachytene, diplotene and diakinesis.

221. Which of the following events takes place during diplotene stage of prophase-I of meiosis?
(a) Compaction of chromosome
(b) Formation of synaptonemal complexes
(c) Formation of recombinational nodules
(d) Dissolution of synaptonemal complexes

DUMET-2010

Ans. (d) : During diplotene stage of prophase-I of miosis-I. The dissolution of the synaptonemal complex and the tendency of recombined homologous chromosome of the bivalent to separate from each other except at the sites of cross over.

222. The exchange of segments of non-sister chromatids between chromosomes of a homologous pair is termed as
(a) transformation
(b) translocation
(c) crossing over
(d) chromosomal aberration

DUMET-2010

Ans. (c) : The exchange of segment of non-sister chromatids between chromosomes of homologous pair is termed as crossing over. In this process two homologous non-sister chromatids pair up with each other and exchange different segment of genetic material to form two recombinant chromosome sister chromatids.

223. The enzyme involved in the crossing over between two homologous chromosome is
(a) nuclease (b) RNA polymerase
(c) recombinase (d) DNA polymerase

J&K CET-2014

Ans. (c) : Crossing over is an enzyme-mediated process and the enzyme involved is called recombinase, Recombinase enzyme is involved during pachytene stage. Crossing over leads to recombination of genetic material on the two chromosomes.

224. The centromere or primary constriction of the chromosome contains rings of proteins that are intimately associated with a spindle fibre. These rings are called
(a) centrioles
(b) secondary constriction
(c) asters
(d) kinetochores

BHU PMT (Screening)-2010

Ans. (d) : Kinetochore is a proteinaceous structure assembles around the centromere of chromosome which helps in binding in spindle microtubule. The kinetochore is the region which is present in the center of the chromosome.

225. Which of the following characters is related with telophase?
(a) Formation of nuclear membrane
(b) Formation of nucleolus
(c) Elongation of chromosome
(d) Formation of two daughter nuclei cytokinasis

Uttarakhand PMT-2009
MP PMT-2009

Ans. (a) : The process of mitosis which divides the duplicated genetic material carried in the nucleus of a parent cell into two identical daughter cells is called telophase.

- To isolated the nuclear DNA from the cytoplasm a nuclear membrane develops around each set of chromosomes during telophase.
- Telophase is the final stage of both meiosis and mitosis.
- The consequences of prophase and prometaphase (disintegration of the nucleous and nuclar membrane) are reversed during telophase.
- As chromosomes reach the cells poles, a nuclear envelope form around, nucleoli resurface and chromosomes begin to decondense back into the extended chromatin of interphase.

226. During meiosis-I, the number of chromosomes is
(a) Halved (b) Tripled
(c) Doubled (d) Quadrupled

J&K CET-2015

Ans. (a) : A special kind of cell division that reduces the chromosome number by half result in the production of haploid daughter cell. This kind of division is called meiosis. Meiosis-I is initiated after the parental chromosomes have replicated to produce identical sister chromatids at the S shape.

227. Which is correct for meiotic metaphase -1?
(a) Bivalents are arranged at equator
(b) Univalents are arranged at equator
(c) Non-homologous chromosomes forms pair
(d) Spindle fibres are attached at chromomere

J&K CET-2006

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Ans. (a) : During metaphase-I the bivalent chromosomes align on the equatorial plate. The microtubules from the opposite poles of the spindle attached to the kinetochore of homologous chromosomes.

228. The chromosome becomes gradually visible with compaction of chromosomes during the meiotic stage
(a) diplotene (b) leptotene
(c) zygotene (d) pachytene

AMU-2012

Ans. (b) : Chromosomes are visible as long and slender threads. They are much finer than those in mitotic prophase.
each chromosome has replicated and consist of two sister chromatics.

229. Arrange the following events of meiosis in the correct sequence.
I. Terminalisation
II. Crossing over
III. Synapsis
IV. Disjunction of genomes.
The correct sequence is
(a) IV, III, II, I (b) III, II, I, IV
(c) II, I, IV, III (d) I, IV, III, II

VMMC-2010
EAMCET-2005

Ans. (b) : The correct sequence of meiosis is-
Synapsis → Crossing over → Terminalization → Disjunction of genomes.

230. Chiasma shows the sites of
(a) Spindle formation (b) Synapsis
(c) Crossing over (d) None of these

HP CET-2012

Ans. (c) : During prophase-I homologous chromosomes make conducts with each other called chiasmata and crossing over occurs. This is where chromosomes exchange sections of DNA. This is important for generating genetic diversity but is also crucial mechanically hold homologous chromosomes together.

231. Visible expression of the genetic phenomenon of crossing over is called
(a) Recombination (b) Condensation
(c) Chiasmata (d) Spiralization

Karnataka CET-2012

Ans. (c) Chiasma is the visible expression of the genetic phenomenon of crossing over. It is a cross shaped structure that forms between two homologous chromosomes during the diplotene stage of prophase I of meiosis.

232. Identify the substage of prophase I of meiosis during which synapsis takes place
(a) Leptotene (b) Pachytene
(c) Diplotene (d) Zygotene

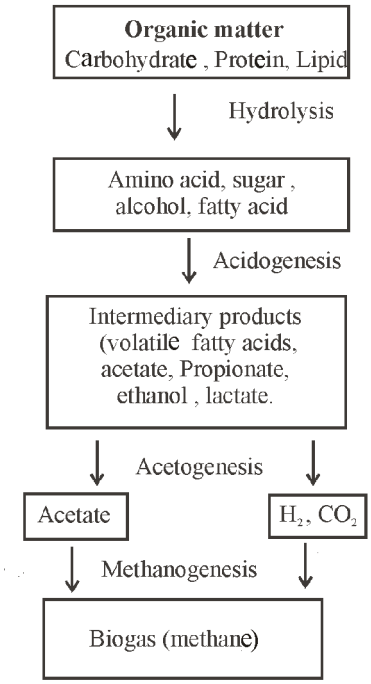
Karnataka CET-2008

Ans. (d) : Zygotene is the stage of prophase-I at which synapsis take place. The pairing of homologus chromosomes by the process of synapsis and formation of the synaptonemal complex.

233. Biogas production is carried out by
(a) thermoacidophils (b) methanogens
(c) halophiles (d) ruminants

AFMC-2010

Ans. (b) : Biogas production is carried out by methanogen. Biogas production involved mainly four stepes ; -



234. Statement (S) Non-disjunction is the failure of paired chromosomes to segregate during the metaphase of meiotic divisions of gametogenesis.
Reason (R) Non-disjunction results in production of abnormal gametes.
The correct answer is
(a) Both S and r are true, and R is not a correct explanation to S
(b) S is correct, but R is not correct
(c) S is not correct, but R is correct
(d) Both S and R are true, and R is a correct explanation to S

AP EAMCET-2013

Ans. (d) : Non disjunction is the failure of homologous chromosomes or sister chromatids to separate during cell division. Failure of a pair of homologous chromosomes to separate in meiosis – I . Non disjunction results in daughter cells with abnormal chromosomes numbers.

235. In meiosis crossing over is initiated at
(a) Diplotene (b) Pachytene
(c) Leptotene (d) Zygotene

NEET-2016 Phase-I

Ans. (b) : In pachytene recombination nodule is formed after which **crossing over**. Pachytene stage is characterized by formation of **synaptonemal complex** which allows the exchange of genetic material between the homologous chromosomes by a process known as

@apna_pdf

crossing over. This also helps in generation of recombinants.

- **Diplotene -** This stage characterized by **chiasmata formation.**
- **Lepotene -** In this stage chromosomes begin to condense.
- **Zygotene-** In this stage **synapsis** taken place.

236. Match the following column-I with column-II.

	column-I		column-II
A.	Carcinogen	1.	Cancerous tumour
B.	Anaphase-I	2.	Disjunction
C.	Mitosis	3.	Synapse
D.	Zygotene	4.	Plectonemic coiling

Codes:

	A	B	C	D
(a)	1	2	4	3
(b)	3	1	4	2
(c)	2	3	1	4
(d)	4	1	3	2

JIPMER-2015

Ans. (a) : Carcinogen – It is the agent that results in cancer or tumour formation. Some well-known carcinogens are asbestos, nickel, cadmium, radon, vinyl chloride and benzene.

Anaphase - In anaphase-I an individual separation of chromosomes occurs. This separation of the chromosomes is known as disjunction.

Mitosis - The types of coiling that occurs during the process of mitosis is plectonemic coiling.

Zygotene - In the Zygotene, homologous chromosomes being the align along their entire length by a process called a synapse.

237. The non-disjunction, in meiosis may result is extra copy of a chromosome in a sperm cell. During which phase the above phenomenon may occur?

(a) Prophase-I, prophase-II
(b) Metaphase-I, anaphase-II
(c) Anaphase-I, anaphase-II
(d) Anaphase-I, telophase-II

JIPMER-2015

Ans. (c) : In anaphase I, segregation of chromosomes occurs. And during anaphase II, chromosomes break from the centromere, when non-segregation occurs, there is failure in the segregation of chromosomes and this results in the formation of gametes with fewer or more chromosomes.

238. Independent assortment of gene occurs due to the orientation of chromosomes at

(a) metaphase-I of mitosis
(b) metaphase-I of meiosis
(c) metaphase-II of meiosis
(d) any phase of the cell division

JIPMER-2015

Ans. (b) : Independent assortment is defined as the inheritance of the character within the same individual. This is due to the orientation of the chromosome at the equatorial plane in the metaphase-I of meiosis.

It is random orientation homologous chromosome pairs during metaphase-I allow for the production of gametes with many different assortments of homologous chromosomes.

239. During gamete formation, the enzyme recombinase participates during:

(a) Prophase-I (b) Prophase-II
(c) Metaphase-I (d) Anaphase-II

AIPMT (Screening)-2012

Ans. (a) : During gamete formation , the enzyme recombinase participates during prophase –I of meiosis. Enzyme recombines observed during the pachytene stage where in enzyme recombinase helps in recombination of genes between homologous chromosome.

240. Activity of ligase enzyme is found in

(a) Leptotene (b) Zygotene
(c) Pachytene (d) Diplotene

AP EAMCET-2010

Ans. (c) Ligase enzyme is involved in the process of DNA recombination, which occurs during the pachytene stage of meiosis. Ligase is responsible for sealing the DNA breaks that are created during recombination

241. Study the following list

List I	List II
(A) Initiation of spindle fibres	1. Anaphase-I
(B) Synthesis of RNA and Protein	2. Zygotene
(C) Action of endonuclease	3. G_1 phase
(D) Movement of chromatids towards opposite poles	4. Pachytene
	5. Anaphase-II

The correct match is

	A	B	C	D
(a)	2	3	4	5
(b)	3	2	1	5
(c)	1	3	5	4
(d)	5	3	1	2

AP EAMCET-2009

Ans. (a) :

- Initiation of spindle fibre - Zygotene
- Synthesis of RNA and Protein - G_1 -Phase
- Action of endonuclease - Pachytene
- Movement of Chromatid towards opposite pole. - Anaphase II

Zygotene –During zygotene, homologous chromosomes begin to align along their entire length by a process called **synapsis** that is necessarily precise. Each pair of chromosome is held together by a ribbon-like protein and forms the synaptonemal complex.

Anaphase- II begins with the simultaneous splitting of the centromere of each chromosome into two. Consequently, the daughter chromosomes move towards the opposite poles of the cells.

@apna_pdf

G_1-Phase is an intermediate phase occupying the time between the end of cell division in mitosis and the beginning of DNA replication during S- phase.

Pachytene- The third stage of prophase of meiosis, begins with completion of synapsis during which the paired Chromosomes shorten and thicken. Each of the two chromatids separate and exchange of chromosome material occur between homologous chromosome through the process of crossing over.

242. When paternal and maternal chromosomes change their materials with each other in cell division this event is called :

(a) synapsis
(b) crossing over
(c) bivalent-forming
(d) dyad-forming

JIPMER-2003

Ans. (b) : Crossing over is reciprocal exchange of equal and corresponding segment between non-sister chromatids in a pair of homologous chromosome. It leads to recombination of genes present on two homologus chromosomes.

Synapsis – It is the pairing of two homologous chromosome that occurs during meiosis. It is also called as synapsis.

243. Study the following lists

	List-I		List-II
(A)	**Anaphase-I**	**(I)**	**Splitting of the centromere**
(B)	**Anaphase-II**	**(II)**	**Recombinase**
(C)	**Pachytene**	**(III)**	**Sister chromatides associated at their centromere**
(D)	**Diakinesis**	**(IV)**	**Chromosomes aligned on the equatorial plate**
		(V)	**Nucleolus disappears**

The correct match is

	A	B	C	D
(a)	(III)	(I)	(II)	(V)
(b)	(III)	(V)	(II)	(IV)
(c)	(II)	(III)	(V)	(IV)
(d)	(I)	(III)	(IV)	(II)

TS EAMCET-2015

Ans. (a) : Anaphase-I–The homologus pairs of chromosomes (non-sister chromatids) are pulled to opposite poles of the cell by breaking their connection with each and get separated. This process of separation of homologus chromosomes is called disjunction. Each daughter cell at this point has one chromosomes, each containing two sister chromatids.

Anaphase-II – It is the stage when sister chromatids of every chromosome separate and begin to move towards the opposite ends of the cell.

Pachytene – Crossing over (recombination occurs)

Diakinesis – Nuclear membrane disappears, centriodes migrate to poles and spindle fibers begins to form.

244. At which stage of the meiosis, the bivalents are formed?

(a) Leptotene (b) Pachytene
(c) Zygotene (d) Diplotene

J&K CET-2002

Ans. (c) : Zygotene – At zygotene stage of meiosis, the bivalent or a tetrad are formed.

The pairing of homologus chromosomes take place at this stage. This phenomenon known as synapsis. Each pair of homologus chromosomes forms as a result of synapsis is called a bivalent or a tetrad.

Leptotene – Beaded long chromosomes.

Diplotene – Bivalent repel each other except at site of crossovers.

245. Variation in character are brought about by;

(a) duplication of chromosomes during mitosis
(b) mutations
(c) crossing over during meiosis
(d) both (b) and (c)

J&K CET-2002

Ans. (d) : Genotypic variation are occurs due to the difference in number or structure of chromosomes or by difference in the genes carried out by the chromosomes. This is called mutation. Crossing over is also responsible for variation by the exchange of chromosomal material during meiosis.

Due to mitosis genetically identical daughter cells produces so it is not responsible for variation.

246. Recombination of genes occur at:

(a) prophase in mitosis
(b) prophase-I in meiosis
(c) prophase-II in meiosis
(d) metaphase-H in meiosis

J&K CET-2002

Ans. (b) : Recombination of genes occur at prophase I- in meiosis during pachytene stage. It is a longest phase because it take time to crossing over. This stage is characterized by the presence of recombination nodules. Pachytene involves mutual exchange of the corresponding segments of non-sister chromatids of homologous chromosomes.

247. The exchange of chromosomal segment between two non-homologous chromosomes called as

(a) crossing-over (b) translocation
(c) inversion (d) duplication

Assam CEE-2014

Ans. (b) : Translocation - When two non homologous chromosomes exchange their parts, the resulting chromosomal rearrangements are translocations. It may be reciprocal or non-reciprocal. Non reciprocal translocation involves the transfer of a segment in one direction from one chromosomes to another. In reciprocal translocation, the most common type is segment from one chromosome is exchanged with a segment form another non-homologous chromosome.

248. The pairing of homologous chromosomes in meiosis is known as.

(a) bivalent (b) synapsis
(c) disjunction (d) synergids.

AIIMS-1994

@apna_pdf

Ans. (b) : Synapsis is an event that occurs during meiosis in which homologous chromosomes pair. Synapsis is the pairing of two homologous chromosome that occurs during prophase-I of meiosis. It allows matching up of homologous pairs prior to their segregation. Synapsis are two specialized cell lying adjacent to the egg cell in the female gametophyte of angiosperms.

249. During meiosis, crossing over occurs between:

(a) Sister chromatids of homologous chromosome
(b) Non-sister chromatids of homologous chromosome
(c) Sister chromatids of non-homologous chromosome
(d) Non-homologous chromatids of homologous chromosome

BVP-2004

Ans. (b) : Crossing over is a reciprocal exchange of equal and corresponding segment between non-sister chromatids in a pair of homologus chromosomes. It leads to recombination of gene present on two homologus chromosomes and enzyme involve in crossing over is called recombinase.

250. The second meotic division leads to:

(a) separation of sex chromosomes
(b) fresh DNA synthesis
(c) separation of chromatids and centromere
(d) separation of homologus chromosomes

BVP-2005
DUMET-2003

Ans. (c) : After interkinesis, the second division of meiosis takes place. During this division the centromere of each chromosome divides during anaphase so that each of the new cells gets one of the two chromatids. The final result being the creation of four haploid cells.

251. Among the following which one is longest phase in prophase of meosis?

(a) Leptotene (b) Zygotene
(c) Pachytene (d) Diplotene

BVP-2005

Ans. (d) The longest phase in prophase of meiosis is diplotene. In the diplotene chromosome begins to start separate, terminalization of chiasmata occur in homologous chromosome. In oocytes of some vertebrates, diplotene can lost for month or years.

252. The non-sister chromatids twist around and exchange segments with each other during

(a) Diplotene (b) Diakinesis
(c) Leptotene (d) Pachytene
(e) Zygotene

Kerala PMT-2009

Ans. (d) : During pachytene, the homologous chromosomes pair up and undergo synapsis. This is when the non-sister chromatids twist around and exchange seqments with each other. This process is called crossing over.

253. Find the correctly matched pairs and choose the correct option

A. Leptotene-The chromosomes become invisible
B. Zygotene-Pairing of homologous chromosomes
C. Pachytene- Dissolution of the synaptonemal complex takes place
D. Diplotene-Bivalent chromosomes appear as tetrads
E. Diakinesis-Terminalization of chiasmata takes place

(a) A and B are correct
(b) B and D are correct
(c) B and E are correct
(d) B and C are correct
(e) C and D are correct

Kerala PMT-2012

Ans. (c) : Zygotene – Synapsis or paring of homologous chromosomes occur. Bivalents form synaptonemal complex to stabilize paired condition of chromosome. Chromosomes becomes short and thicker.
Diakinesis – The final stage of meotic prophase-I. This is marked by terminalization of chiasmata and spindles is assembled to prepare the homologous chromosomes.

254. During the meiotic division, the

(a) homologous chromosomes are separated
(b) linkage in disturbed
(c) homologous chromosomes do not segregate
(d) All of the above

JIPMER-2010
BHU PMT (Screening)-2005

Ans. (a) : In the meiosis mother cell divides two times after one round of DNA replication.
Meiosis I- Reductional division – The separation of homologous chromosome occur.
Meiosis II- Equational division – Daughter cell have same number of chromosome as the parents cell enter in meiosis-II know as homotypic division.

255. Genetic content of a cell reduces to half during

(a) meiotic prophase I (b) mitotic prophase
(c) meiotic prophase II (d) meiotic telophase

KVPY SB & SX-2013

Ans. (d) : Meiosis is a specialized from of cell division in which number of chromosomes is reduced to half, creating genetically distinct haploid cells.
Telophase I - The meiosis-I effectively ends when the chromosomes arrives at the poles. Each daughter cell now has half the number of chromosomes but each chromosomes consist of a pair of chromatids.

256. Meiosis I and Meiosis II are characterised by the separation of

(a) homologous chromosome; sister chromatids
(b) sister chromatids; homologous chromosomes
(c) centromere; telomere
(d) telomere; centromere

KVPY (SA)-2013

@apna_pdf

Ans. (a) : The process of meiosis is divided into two phases- Meiosis – I and Meiosis – II

Meiosis–I → Anaphase I → In the two cells separation and distribution of homologous chromosome occur.

Meiosis–II → Anaphase II → Separation of duplicated/sister chromatic occur in two cells.

257. During meiosis there is

(a) one round of DNA replication and one divisions

(b) two rounds of DNA replication and one divisions

(c) two rounds of DNA replication and two divisions

(d) one round of DNA replication and two divisions

KVPY (SA)-2011

Ans. (d) : Meiosis is a type of cell division that produces four haploid cells from a single diploid cell. It involves one round of DNA replication followed by two rounds of cell division. The first round of cell division is called meiosis I, and the second round is called meiosis II.

258. In human females, meiosis-II is not completed until?

(a) Birth

(b) Puberty

(c) Fertilization

(d) Uterine implantation

AIPMT (Re-Exam)-2015

Ans. (c) : In human females, meiosis-II is not completed until fertilization. Secondary oocyte is arrested in metaphase-II until sperm contacts plasma membrane of the oocyte and complete meiosis-II. In oogenesis, the primary oocytes undergoes meiosis up to the interphase or upto prophase I (diakinesis).

- The primary oocytes oocyte (2n) undergoes meiosis –I to produce two haploid cells (n), larger one is called Secondary oocyte oocyte and the smaller one in 1st polar body.
- Secondary oocyte undergoes the process of meiosis-II and proceeds upto metaphase II only. Completion of meiosis-II results in the formation of ovum and 2nd polar body.

259. Crossing over occurs

(a) single strand stage (b) two strand stage

(c) four strand stage (d) eight strand stage

UP CPMT-2009

Ans. (c) : In diplotene stage of prophase I of meiosis, each chromosome splits longitudinally into two chromatids and now bivalent is composed of four chromatids. This state is known as the four –strand stage or tetrad. Crossing over occurs in 4-strand stage It refers to the exchange of genetic material or chromosome segments between non- sister chromatids in meiosis. Crossing over is an enzyme mediated process, where the exchanges of genetic material between non-sister chromatids of homologous chromosomes takes place, its occur at the pachytene stage of prophase-I of meiosis.

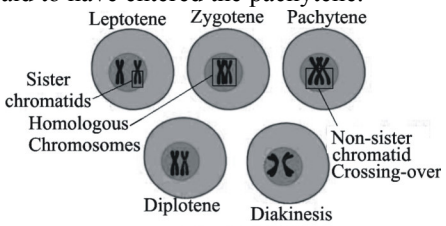
260. When synapsis is complete all along the chromosome, the cell is said to have entered a stage called?

(a) zygotene (b) pachytene

(c) diplotene (d) diakinesis.

CMC Vellore-2012
AFMC-2008
AIIMS-2005

Ans. (b) : Synapsis is the process of pairing of homologous chromosomes. It occurs during the pachytene stage of prophase I of meiosis. When synapsis is complete all along the chromosome.. The cell is said to have entered the pachytene.



Prophase I of Meiosis I

261. Synaptonemal complex is a structure of

(a) cytokinesis

(b) terminalisation

(c) chromosomal disfunction

(d) chromosomal pairing

BCECE-2015

Ans. (d) : The synaptonemal complex is a protein structure that forms between homologus two pairs of sister chromatids, during meiosis. It is a protein lattice that resembles railroad tracks and connects paired homologous chromosomes in most meiotic systems. It is thought to mediate synapsis and recombination during meiosis-I in eukaryotes. It is a complex protein structures.

262. Select the matched ones :

A. S phase DNA replication
B. Zygotene Synapsis
C. Diplotene Crossing over
D. Meiosis Both haploid and diploid cells
D. Gap 2 phase Quiescent stage

(a) A and B only (b) C and D only

(c) C and E only (d) A, C and E only

(e) A and D only

Kerala PMT-2011

Ans. (a) : S-phase:- It is also called as synthesis phase. Marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles.

Zygotene :- Synapsis pairing of chromosomes occurs. Bibalent forms synaptonemal complexes to stabilize paired condition of chromosomes.

263. The meiosis is divided into two parts meiosis-I and II. The correct sequence of stages of cell division of meiotic-I, prophase is

(a) zygotene → leptotene → diplotene → diakinesis → pachytene

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(b) leptotene → zygotene → pachytene → diplotene → diakinesis
(c) leptotene → diplotene → pachytene → dikinesis → zygotene
(d) diakinesis → diplotene → pachytene → zygotene → leptotenee
(e) leptotene → diakinesis → zygotene → pachytene

CMC Vellore-2015

Ans. (b) : The correct stages of cell division –
Leptotene → Zygotene → Pachytene → Diplotene → diakinesis.
Leptotene:- The initialization of chromosomes condensation takes place.
Zygotene:-The homologous chromosomes pair the process is called chromosomal synapsis.
Pachytene:- Crossing over of non-sister chromatids of homologous chromosomes takes place.
Diplotene:- It marks the synaptonemal complex dissolution and separation of homologous chromosome.
Diakinesis:- Disappearance of nucleolus takes place.

264. Which of the following is/are characteristic feature (s) of meiosis?

I. Number of choromosomes gets halved.
II. Crossing over takes place between non-homologous chromosomes, resulting in variation.
III. Helps in development of zygote into emboryo.
IV. It occurs in reproductive cells only.

(a) I and IV
(b) I, II and IV
(c) II, III and IV
(d) All of these
(e) None of the above

CMC Vellore-2015

Ans. (a) : Meiosis is a special type of cell division that reduces the number of chromosomes by half results in the production of haploid daughter cell. It ensures the production of haploid phase in the life cycle of sexually reproducing organisms why as fertilization restores the diploid phase.

265. A bivalent of meiosis I consists of

(a) Four chromatids and two centromeres
(b) Two chromatids and one centromere
(c) Two chromatids and two centromeres
(d) Four chromatids and four centromeres

Karnataka CET-2013

Ans. (a) A bivalent is a homologous chromosomes that have been paired up during prophase I of meiosis. Each chromosome consist of two sister chromatids that are held together by a centromere, So a bivalent consist of four chromatids and two centromeres.

266. Synapsis is found in:

(a) leptotene phase (b) zygotene phase
(c) pachytene phase (d) diplotene phase

Rajasthan PMT-1997

Ans. (b) : Synapsis occurs during prophase-I of meiosis in the zygotene stages. In this phase the chromosomes becomes shorter and thicker bivalent or tetrad are seen. Synapsis of chromosomes occurs and forms bivalent synaptonemal complexes to stabilize the paired position of chromosomes.

267. Exchange of paternal and maternal chromosomes material during cell division is called

(a) dyad formation (b) bivalent formation
(c) synapsis (d) crossing over

J&K CET-2013

Ans. (d) : Crossing over is the exchange of genetic material between two homologous non-sister chromatids. It occurs during prophase I of meiosis, when the homologous chromosomes are paired up. The exchange of genetic material can lead to new genetic combination in the offspring.

268. Identify the correct combination regarding Anaphase, Anaphase-I and Anaphase-II

(a) Anaphase - centromere splits,
Anaphase - I - Centromere splits,
Anaphase - II Centromere splits
(b) Anaphase - chromatids move to opposite poles;
Anaphase - I - Homologous chromosomes separate;
Anaphase – II- centromere splits.
(c) Anaphase - chromosomes cluster at opposite poles;
Anaphase – I- Homologous chromosomes separate;
Anaphase – II- Centromere splits
(d) Anaphase - chromosomes move to opposite poles;
Anaphase - I - Homologous chromosomes separate,
Anaphase - II - Centromere splits.

AP EAMCET-2015

Ans. (b) : Anaphase:- The spindle fibre splits the centromere and the chromatids move to opposite side of the cell.
Anaphase-I:- The third stage of the Ist meiotic division after prophase-I. The separation of paired homologous chromosomes towards opposite ends of the cell.
Anaphase –II:- It is same as the anaphase of mitosis, in which the centromere becomes half and chromosomes starts moving in opposite direction. After this, cytokinesis takes place.

269. Assertion (A) : Events in pachytene play a key role in evolutionary changes in organisms.
Reason (R) : Exchange of genetic material takes place between sister chromatids of homologous chromosomes.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)

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(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

AP EAMCET-2015

Ans. (c) : In pachytene stage of prophase I of meiosis I crossing over occur that creates new combination of genes which is the source of variation. So events in pachytene is associated with the evolutionary changes in organism. The exchange of genetic material is not occur in between sister chromatids of Homologous chromosome. It occurs in between non-sister chromatids of Homologous chromosome.

270. Exchange of genetic material two homologous chromosomes occurs in

(a) Zygotene (b) Pachytene
(c) Diakinesis (d) Anaphase I

TS EAMCET-15.05.2016

Ans. (b) : In the process of "crossing over". Which often occurs during the tetrad formation of meiosis, homologous exchange portions of their genetic code.

- The exchange of genetic material between two homologous chromosome is occur in the pachytene stage of prophase I of meiosis I.

271. Chiasmatas appear in which of the following phase?

(a) Zygotene (b) Diplotene
(c) Pachytene (d) Diakinesis

Rajasthan PMT-1995

Ans. (b) : Chiasmata represent the location where crossing over has occurred. It appears in diplotene stage of prophase I.

Zygotene:- Chromosomes becomes short and thick bivalents or tetrad pairs of chromosomes homologous are seen.

Pachytene:- It is charactedrized by the presence of recombination nodules.

Diakinesis:- Centrioles migrates to poles and spindle. fibre starts towards to form.

272. The frequency of crossing - over occurring between two genes located on the same chromosome depends on

(a) Length of the chromosome
(b) Position of the centromere
(c) Activities of two genes
(d) Distance between two genes

WB JEE-2014

Ans. (d) : The frequency of crossing-over occurring between two genes located on the same chromosome depends on the distance between the genes. The further apart the genes are on the chromosome, the higher the likelihood of crossing-over events between them during meiosis. This is because crossing-over is random process that increases with increasing physical distance between the genes on the chromosome.

273. A structure called Synaptonemal complex, which is considered to be physical structure which is associated with synapsis of homologous chromosomes was discovered by :

(a) King (b) Moses
(c) Griffith (d) Balbiani

BVP-2006

Ans. (b) : Synaptonemal complex was first time discovered by Montrose Moses in 1956. He was studying the chromosomes if the grasshopper under an electron microscope when he observed a distinctive structure that formed between homologous chromosomes during prophase I of meiosis. He named this structure the synaptonemal complex.

274. Gobar gas contains mainly :

(a) $CH_4 + CO_2$ (b) $CH_4 + CO_2$
(c) $CO_2 + H_2$ (d) $CO_2 + H_2O$

Haryana PMT-2000

Ans. (a) : The main component of Gobar gas is methane(CH_4),which makes up about 50-70% of the gas. Carbon dioxide(CO_2)is the next most abundant component making up about 30-40% of the gas.

275. Chromosomes replicate in which stage of meiosis?

(a) Prophase -I (b) Prophase -II
(c) Telophase -II (d) Interphase

WB JEE-2008

Ans. (d) : In replication of chromosomes in stage of interphase. It is the first stage of cell cycle and the period before cell division. During this phase the cell matures copies its DNA and prepare to divides. The replication of chromosome occur during the S phase.

276. Match the sub-stage of prophase I of meiosis in Column I and the events in Column II and choose the right option.

	Column I		Column II
(A)	Leptotene	(1)	Terminalization of chiasma
(B)	Zygotene	(2)	Crossing over and recombination
(C)	Pachytene	(3)	Synapsis
(D)	Diakinesis	(4)	Visibility of chromosomes

(a) A - 1 B - 2 C - 3 D - 4
(b) A - 1 B - 3 C - 2 D - 4
(c) A - 4 B - 3 C - 2 D - 1
(d) A - 4 B - 1 C - 2 D - 3
(e) A - 4 B - 2 C - 3 D - 1

Kerala PMT-2014

Ans. (c) :

Column I	Column II
Leptotene	Visibility of chromosomes
Zygotene	Synapsis
Pachytene	Crossing over and recombination
Diakinesis	Terminalization of chiasma

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11 TRANSPORT IN PLANTS

A. Method of Transport

1. Active transport occurs

(a) against concentration gradient and requires ATP
(b) against concentration gradient and does not require ATP
(c) along concentration gradient but require ATP
(d) along concentration gradient but does not require ATP

TS EAMCET-02.05.2018 Shift-II
Tripura JEE-2017
BVP-2012 / AMU-2010
BHU-PMT (Screening)-2008
MGIMS Wardha-2006
BCECE-2014, 2003 / Manipal-2001

Ans. (a) : Active transport occurs against concentration gradient and requires ATP. Active transport is the movement of solute or solvent molecules against the concentration gradient. It requires the expenditure of energy in the from ATP.
Active transport requires specialized carrier proteins and expenditure of cellular energy.

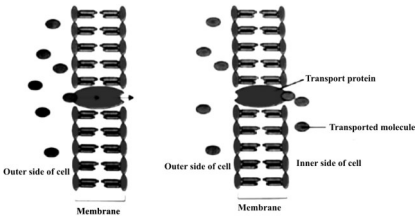
2. Choose incorrect statement related to diffusion

(a) Transport by diffusion in plants is limited to short distance
(b) Diffusion is limited to short distance
(c) Diffusion is not dependent on a living system
(d) Energy is spent for the diffusion of substances

AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Transportation by diffusion in plant is limited to short distance and diffusion is not dependent on a living system and the energy is not spent for the diffusion.

3. Identity the following process and choose the correct option?



(a) Facilitated diffusion (b) Osmosis
(c) Deplasmolysis (d) Simple diffusion

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : The process shown in the figure is facilitated diffusion. It is the process of moving molecules from high to low concentration across a membrane by using a protein channel in the membrane Facilitated diffusion does not use energy but relies on a protein to facilitate movement.

4. Choose the incorrect pair of movements

(a) Diffusion - Short
(b) Translation-Bulk
(c) Apoplast-living components
(d) Root pressure-small heights

AP EAMCET-25.09.2020 Shift-II

Ans. (c) : The apoplast (outer space) in non-living continuous system of plant which consists of plant which consists of cell wall, inter cellular spaces and xylem channels this is called free space.

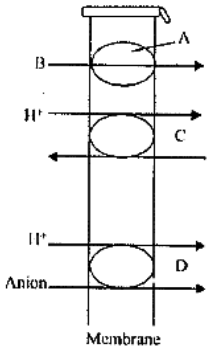
5. Identify the correct phenomenon with reference to transport in plants.

(a) Hormones are chemical stimulators always transport towards growing points.
(b) Transport of water and minerals through non living conducting tissue is multidirectional.
(c) Transport of solutes through living conducting tissue is unidirectional.
(d) Diffusion and cytoplasmic streaming supplemented by active transport is necessary for movement of substances to shorter distance.

AP EAMCET-24.04.2019 Shift-II

Ans. (d) : The substances that need to be transported in a flowering plant are water mineral nutrients, organic nutrients and plant growth regulators. Diffusion and cytoplasmic streaming supplemented by active transport is necessary for movement of substances to shorter distance. Transport over long distances proceeds through the vascular system (xylem and phloem) and is called translocation.

6. What do A, B, C and D represent in the following figure?



(a) A : carrier protein, B: symport, C : uniport, D : antiport
(b) A : carrier protein, B : uniport, C: antiport, D : symport
(c) A : carrier protein, B; antiport, C : symport, D: uniport
(d) A : carrier protein , B : uniport, C : symport, D : antiport

AIIMS-26.05.2019 Shift-I
AIIMS-2010

Ans. (b) : A : carrier protein, B : uniport, C: antiport, D : symport

@apna_pdf

7. The main difference between active and passive transport across cell membrane is :

(a) Active transport occurs more rapidly than passive transport.
(b) Passive transport is non-selective whereas active transport is selective.
(c) Passive transport requires a concentration gradient across a biological membrane whereas active transport requires energy to move solutes.
(d) Passive transport is confined to anionic carrier proteins whereas active transport is confined to cationic channel proteins.

NEET (Odisha)-2019

Ans. (c) : The main difference between active and passive transport across cell membrane is passive transport requires a concentration gradient across a biological membrane whereas active transport requires energy to move solutes.
This is because– Materials are transported across a membrane using a mobile carrier protein and ATP in Active Transport.

8. Which of the following elements is responsible for maintaining turgor in cells?

(a) Magnesium (b) Sodium
(c) Calcium (d) Potassium

NEET-2018

Ans. (d) : Potassium ion is responsible for maintaining the turgidity of cells.
Potassium ion regulates the proton pumps, present on guard cells during the opening and closing of stomata.
The stomata opening and closing depends on the generation of potassium ion gradient in guard cells.
Increasing in K^+ ion concentration in the guard cells makes them hypertonic so more water drawn inside the cells thus guard cell become turgid, widening the stomata opening.

9. Grahams law is correlated with

(a) diffusion (b) osmoregulation
(c) osmosis (d) absorption

WB JEE-2009

Ans. (a) : Graham's law states that at same pressure and temperature, rate of diffusion of gas is inversely proportional to its molecular mass. Graham's law was formulated by Scottish physical chemist themes Graham in 1848. The formula can be written as $\frac{\text{Rate}_1}{\text{Rate}_2} = \sqrt{\frac{M_1}{M_2}}$

10. Translocation of sugars in flowering plants occur in the form of :

(a) glucose (b) starch
(c) sucrose (d) maltose

AFMC -2011
VMMC-2002

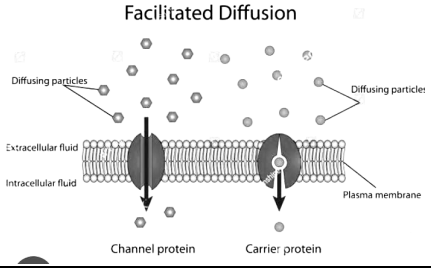
Ans. (c) : Translocation of sugars in the flowering plants occurs in the form of sucrose, because sucrose is more energy efficient in storage and transferring less reactive than glucose and water soluble.

11. Facilitated diffusion (1) occurs from higher concentration to lower concentration (2) takes place along the concentration gradient (3) form carrier-transport complex (4) is sterospecific

(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (b) : Facilitated diffusion is the process of spontaneous transport of molecules or ions across a biological membrane via specific trans membrane integral proteins.
Facilitated diffusion take place along the concentration gradient from higher to lower concentration.



12. Which of the following does not require carrier molecules during transport through cell membranes?

(a) simple diffusion (b) facilitated diffusion
(c) $Na^+ - K^+$ transport (d) none of these

JIPMER-1998

Ans. (a) : Simple diffusion does not require carrier molecules during transport through cell membranes
Simple diffusion :- Movement of molecules from higher concentration to lower concentration does not require carrier molecule for transport through cell membrane.

13. The membrane which allows passage of certain substances more readily than others is termed as:

(a) permeable (b) selectively permeable
(c) semipermeable (d) impermeable

HP CET-2011

Ans. (b) : The membrane which allows passage of certain substances more readily than others is termed as selectively permeable. A permeable membrane is one which allows the movement of both the solvent and solute across it. For example cell wall.

14. In trees death of protoplasts is essential for a vital function such as:

(a) stomatal movements (b) water transport
(c) food transport (d) both (b) and (c)

JIPMER-1997

Ans. (b) : In trees death of protoplasts is essential for a vital function such as water transport. Tracheids serve on the wall. Tracheids serve for support and for upward conduction of water and dissolved minerals of water and dissolved minerals in all vascular plants and are the only such elements in conifers and ferns.

15. Which one of the following doesn't help in molecule transport?

(a) Diffusion (b) Osmosis
(c) Surface tension (d) Active transport

Haryana PMT-2005
BHU PMT-2003

Ans. (c) : Surface tension is not involved in the transport of molecules but is an important force, that ensures movement of water as a sheet or mass. We often see this occur with water but it occurs with all other liquids to some degree.

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16. Which of the following criteria does not certain to facilitated transport?
(a) Uphill transport
(b) Requirement of special membrane proteins
(c) High selectivity
(d) Transport saturation

NEET-2013

Ans. (a) : The criteria does not certain to facilitated transport uphill transport. Facilitated transport is across the plasma membrane with the aid of carrier proteins.

17. What is correct about the movement of substance across the membrane in facilitated diffusion?
(a) It is an active transport
(b) It doesn't cause transport of molecules from low concentration to high concentration
(c) It is insensitive to inhibitors
(d) It is a very specific transport

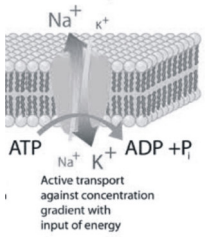
AIIMS-2010

Ans. (b) It doesn't cause transport of molecules from low concentration to high concentration. It is still passive transport because the solute is moving down the conc. gradient.

18. Na^+/K^+ pump is associated with:
(a) passive transport (b) active transport
(c) osmosis (d) imbibition

AIIMS-2012

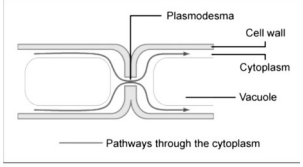
Ans. (b) : The Na^+/K^+ pump is an example of active-transport because energy is required to move the Na^+ and K^+ ions against the concentration gradient. During the sodium/potassium exchange $3Na^+$ out from the cytoplasm to extracellular fluid and $2K^+$ comes to the cytoplasm. In this process, ATP break down ADP+P_i. So, it is **active process**.



19. Plasmodesmata connections help in:
(a) Cytoplasmic streaming
(b) Synchronous mitotic divisions
(c) Locomotion of unicellular organism
(d) Movement of substances between cells.

Rajasthan PMT-2010
AIIMS-2003

Ans. (d) : Plasmodesmata connections help in movement of substances between cells.
Plasmodesmata, the structures that mediate symplasmic transport between plants cells, play an important role in phloem unloading and distribution of sugars and signalling molecules into developing organs.



20. The type of transport taking place across the bio-membranes without the help of proteins is
(a) facilitated diffusion
(b) active transport
(c) simple diffusion
(d) diffusion via symport

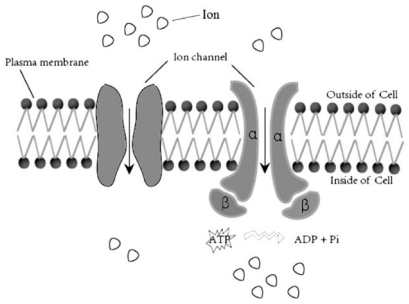
AMU-2014

Ans. (c) : The type of transport taking place across the biomembrane without the help of protein is simple diffusion. In this type of transport, solute particles moves along the concentration gradient through the semipermeable membrane. This type of transport does not require energy for the transport of molecules. Water, oxygen, carbon dioxide, ethanol and urea are transported by simple diffusion.

21. Which statement is incorrect for ion – Channels?
(a) They are proteins
(b) Movement through them is simple diffusion
(c) Movement through them is from high to low concentration
(d) All ions pass through the same type of channel

WB JEE-2008

Ans. (d) : All ions cannot pass through the same type of channel because the volume of each ion will be different.



B. Plant-Water link (Connection) and Imbibition

22. Which type of water is used by plants?
(a) Gravitational water (b) Capillary water
(c) Hygroscopic water (d) Bound water

AP EAPCET-11.07.2022 Shift-I / J&K CET-2011
DUMET-2009 / Punjab MET-2009
CMC Vellore-2009 / Rajasthan PMT-2009
Haryana PMT-2005 / BHU PMT-2003
VMMC-2003 / Haryana PMT-2000

Ans. (b) : Capillary water is used in plants.
The capillary water is readily available to the plants and it s the main source of practically all the water absorbed by them.

23. A thin film of water is held by the soil particles under the influence of internal attractive force it is called :
(a) capillary water (b) combined water
(c) hygroscopic water (d) gravitational water

Karnataka CET-2013 / Manipal-2013
VMMC-2004 / DUMET-2001

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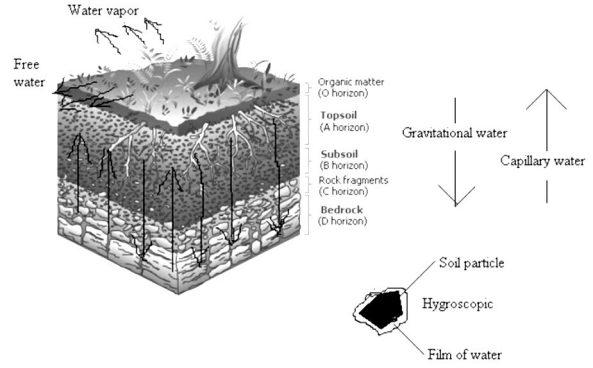
Ans. (c) : A thin film of water is held by the soil particles under the influence of internal attractive force it is called hygroscopic water. The water is held tightly around the soil particles due to forces. This type of water in soil is not available to plants. Hygroscopic water cannot be easily removed by the plants.



24. Which one of the following forms of soil water can be readily absorbed by the roots?

(a) Capillary water (b) Hygroscopic water
(c) Runaway water (d) Gravitational water

VMMC-2010 / Manipal-2005
BVP-2001 / AIPMT-1991

Ans. (a) : In soil water that in readily absorbed by the roots is capillary water.

25. Following is not applicable in terms of plant - water relations, if a seed is soaked in water

(a) water movement along a concentration gradient.
(b) Increase in seeds volume
(c) Helps the seedlings to emerge out form soil
(d) No affinity between adsorbent and liquid

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : During plant-water relationship, if a seed soaked in water show an affinity between the adsorbent (the seed) and the liquid (the water).

26. Match the following lists:

	List-I		List-II
A	**Guttation**	**i**	**Abscisic acid**
B	**Imbibition**	**ii**	**Root endodermis**
C	**Dessication**	**iii**	**Diffusion**
D	**Suberin**	**iv**	**Shoot epidermis**
		v	**Root pressure**

The correct match is:

	(A)	(B)	(C)	(D)
(a)	ii	v	iv	i
(b)	v	iii	i	ii
(c)	iv	ii	v	i
(d)	ii	iii	v	iv

NEET (UG) 07.05.2023
TS EAMCET-09.05.2019 Shift-I

Ans.(b):

List - I	List-II
(A) Guttation	Root pressure
(B) Imbibition	Diffusion
(C) Dessication	Abscisic acid
(D) suberin	Root endodermis.

27. Match List-I with List-II.

	List-I		List-II
(A)	Cohesion	(i)	More attraction in liquid phase
(B)	Adhesion	(ii)	Mutual attraction among water molecules
(C)	Surface tension	(iii)	Water loss in liquid phase
(D)	Guttation	(iv)	Attraction towards polar surfaces

Choose the correct answer from the options given below.

	(A)	(B)	(C)	(D)
(a)	(ii)	(i)	(iv)	(iii)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(iii)	(i)	(iv)	(ii)

NEET-2021

Ans. (b) : Cohesion - Mutual attraction among water molecule.
- **Adhesion -** Attraction towards polar surfaces.
- **Surface tension -** More attraction in liquid phase.
- **Guttation -** Water loss in liquid phase.

28. Match the following?

	Column-I		**Column-II**
A.	**Cohesion**	**i.**	**Resist pulling force**
B.	**Adhesion**	**ii.**	**Water is pulled**
C.	**Tensile strength**	**iii.**	**Ability to rise in trachea**
D.	**Capillarity**	**iv.**	**Attraction between water molecules**
		v.	**Attraction of water molecules to surfaces**

Options:

(a) (A-iv), (B-v), (C-i), (D-iii)
(b) (A-i), (B-ii), (C-iii), (D-iv)
(c) (A-iii), (B-iv), (C-ii), (D-i)
(d) (A-ii), (B-iii), (C-i), (D-v)

AP EAMCET-05.10.2021 Shift-I

Ans. (a) : Correct match:-

Cohesion	Attraction between water molecules
Adhesion	Attraction of water molecules to surfaces
Tensile strength	Resist pulling force
Capillarity	Ability to rise in trachea

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29. Rubber does not swell in water due to absence of _____

(a) Osmosis (b) Plasmolysis
(c) Imbibition (d) Diffusion

AP EAMCET-25.09.2020 Shift-I

Ans. (c) : Rubber does not swell in water due to absence of imbibition. Imbibition is the absorption of water by hydrophilic colloids. Imbibition requires an affinity between the imbibant and substance imbibed. Natural rubber is hydrophobic, thus not absorbing water.

30. Identify the INCORRECT statement about water in the soil.

(a) Water present in the form of hydrated oxides of silicon and aluminium is called combined water
(b) The hygroscopic and combined water is available to the plants for absorption.
(c) Water held between small, non-colloidal soil particles is called capillary water.
(d) Water which is held very tightly around soil particles by adhesive forces is called hygroscopic water.

MHT CET-06.10.2020 Shift-I

Ans. (b) : Water present in the form of hydrated oxides of silicon and aluminium is called combined water. It is not available to plants for absorption. The water which is held very tightly around soil particles by adhesive forces is called hygroscopic water. It is also not available to the plants for absorption by plant.
The water stored between small, non-colloidal soil particles is called capillary water. It is available for absorption by the plants.

31. During germination of seed, water absorption takes place by _____.

(a) endosmosis (b) osmotic pressure
(c) exosmosis (d) imbibition

MHT CET 5.10.2020 Shift-I

Ans. (d) : During germination of seed, water absorption takes place by imbibitions. Seed, germination begins with imbibitions, when the seed takes of water from the soil. The speeds up root development, allowing the seed to access more water while the shoots develop and move above ground toward the sun. All biochemical reactions. Take place in the presence of water and thus the seeds germinate.

32. Match the following

	Set-I		Set-II
A	Glucose	i	Facilitated diffusion
B	Long chain fatty acids	ii	Secondary active transport
C	Vitamin B_{12}	iii	Formation of Micelles
D	Fructose	iv	Castle's intrinsic factor

The correct match is

	(A)	(B)	(C)	(D)
(a)	i	iii	iv	ii
(b)	iv	iii	i	ii
(c)	ii	iii	i	iv
(d)	ii	iii	iv	i

TS EAMCET-09.05.2019 Shift-I

Ans. (d) :

Set -I	Set-II
(A) Glucose	Secondary active transport
(B) Long chain fatty acids	Formation of Micelles
(C) Vitamin B_{12}	Castle's intrinsic factor
(D) Fructose	Facilitated diffusion.

33. With the increase in temperature, the process of imbibitions

(a) decreases (b) increases
(c) remain the same (d) no effect

CG PMT-2011

Ans. (b) : The increase in temperature, the process of imbibitions increases. This can be explained largely on the basis of increase in kinetic activity of imbibing molecules.

34. Imbibition is always accompanied by swelling or increase in the volume of the imbibant. However, the increase in the volume of the imbibant is

(a) more than the volume of water imbibed
(b) some as the volume of the water imbibed
(c) less than the volume of the water imbibed
(d) it depends upon the type of imbibant

CG PMT-2011

Ans. (c) : Imbibition is always accompanied by swelling or increase in the volume of the imbibant. However, the increase in the volume of the imbibant is less than the volume of the water imbibed.
The imbibitions of water continues until a dynamic equilibrium is reached causing an increase in the volume of the imbibant, culminating in huge imbibitional pressure.

35. Process of imbibition involves

(a) adsorption of water
(b) diffusion of water
(c) movement of water into imbibant through capillary
(d) movement of water into imbibant through diffusion as well as capillary action

CMC Ludhiana-2007

Ans. (d) : An imbibant is made of a number of particles separated by fine interstices. During imbibitions water passes into the interstices as well as adsorbed over the particles. The process of imbibiton involes movement of water into imbibant through diffusion as well as capillary action.

36. If a dry wooden stakes driven into a small crack in a rock and then soaked, can develop enough pressure to split the rock. Such pressure is built up through the phenomenon of

(a) plasmolysis (b) imbibition
(c) deplasmolysis (d) none of these

Punjab MET-1999

Ans. (b) : Imbibitions is the absorption of water from the external environment through solids materials such as wood. For the example, water flows into wooden doors and rocks. Due to imbibitions only dry wooden stakes driven in cracks the rock and soaked will develop pressure that will split the rock.
Deplasmolysis- It is the swelling or entry of water to a plasmolysed cell.

@apna_pdf

37. Plants do not store carbohydrate as glucose but do so as starch because glucose
(a) is unstable
(b) attracts herbivores
(c) will change nucleic acids
(d) alters osmotic balance

CG PMT-2007

Ans. (d) : Plants do not store carbohydrate as glucose but do so as starch because glucose alters osmotic balance.

38. Swelling of house hold wooden item like door table and a log in open area during rainy season is due to
(a) endosmosis (b) exosmosis
(c) imbibition (d) diffusion

VMMC-2014 /BVP-2010 / AIIMS-2001

Ans. (c) : Swelling of house hold wooden item like door table and a log in open area during rainy season is due to imbibitions. The process of adsorption of water by solid particles of a substance without forming a solution is called imbibitions.

39. Which of the following plant material is an efficient water imbibant?
(a) Agar (b) Cellulose
(c) Lignin (d) Pectin

Karnataka CET-2008

Ans. (a) : Agar is an efficient water imbibant. Agar obtained from Gelidium and Gracileria. Imbibant is the solid substance which absorbs water and swells up.

40. The first process by which water enters into the seed coat when a seed is placed in suitable environment for germination is
(a) Absorption (b) Imbibition
(c) Osmosis (d) Active transport

Karnataka CET-2007

Ans. (b) : Imbibitions is a type of diffusion where the water is absorbed by the solid particles called colloids causing an enormous increase volume. Therefore, the first process by which water gets into the seed coat when a seed is placed in suitable situation for germination is Imbibition.

41. When pea seeds and wheat grains are soaked in water, pea seeds showed more swelling than the wheat. The reason is
(a) Imbibition capacity of proteins is more than that of starch
(b) Presence of less hydrophilic colloids in the wheat grains
(c) Cell membrane of pea seeds is more permeable
(d) Cell walls of wheat grains are less permeable

AP EAMCET-2007

Ans. (a) : When pea seeds and wheat grains are soaked in water, pea seeds showed more swelling than the wheat because Pea seeds have a high quantity of proteins in them and wheat seeds have high quantities of starch in them. So, the proteins imbibe more water as compared to the starch molecules.

42. Loading of phloem is related to : -
(a) Increase of sugar in phloem
(b) Elongation of phloem cell
(c) Separation of phloem parenchyma
(d) Strengthening of phloem fiber

AIPMT-2001

Ans. (a) : Loading of phloem is related to increase of sugar in phloem.

43. Which of the following has more imbibitions power?
(a) Cellulose (b) Hemicellulose
(c) Fat (d) Protein

CMC Vellore-2013

Ans. (d) : Protein show higher imbibitions capacity than cellulose and fats.
Protein >Cellulose >Hemicellulose > Fat.

44. A column of water within xylem vessels of tall trees does not break under its weight because of
(a) Positive root pressure
(b) Dissolved sugar in water
(c) Tensile strength of water
(d) Lignification of xylem vessels

AIPMT (Re-Exam)-2015

Ans. (c) : A column of water within the xylem vessels of tall trees does not break under its own weight because of tensile strength of water.
- Tensile strength is the ability to resist pulling forces.
- Cohesion, adhesion and surface tension are the forces responsible for movement of water up the tracheary element.
- An account of cohesion force, the water column can bear a tension or pull of upto 100 atm. Therefore, the cohesion force is also called tensile strength.
- Its theoretical value is 15000 atm but the measured value 45 atm to 207 atm.

45. Biolistics (gene-gun) is suitable for
(a) Constructing recombinant DNA by joining with vectors
(b) DNA finger printing
(c) Disarming pathogen vector
(d) Transformation of plant cell

AIPMT (Mains)-2012

Ans. (d) : A gene gun or a biolistic particle delivery system, originally designed for plant transformation , is a device for delivering exogenous DNA (transgenes) to cells.

46. A bottle filled with previously moistened Mustard seeds and water was screw capped tightly and kept in a corner. It blew up suddenly after about half an hour. The phenomenon involved is
(a) diffusion (b) imbibition
(c) osmosis (d) DPD

AIPMT-1990

Ans. (b) : When Mustard seeds are soaked in a bottle and kept in a corner the seeds absorb water due to imbibitions and suddenly fly up.
Adsorption of liquid by any solid material is called imbibitions. It is also a type of diffusion. It helps in the movement of water in to the ovules, which are ripening into seeds.

@apna_pdf

47. When Pea seeds and Wheat seeds are put in water, which of the two will imbibe more water?
(a) Wheat seeds
(b) Pea seeds
(c) Both will imbibe an equal amount of water
(d) Pea seeds imbibe water only at alkaline pH

Punjab MET-2007

Ans. (b) : When pea seeds and wheat seeds are put in water, then both of them will both imbibe an water however, pea seeds have a high quantity of protein in them whereas wheat seeds have high quantities of starch in them. Also, proteins imbibe more water as compared to the starch molecules. Thus pea seeds will imbibe more water.

48. Imbibition involves
(a) diffusion of water
(b) movement of water into imbibant through capillary
(c) movement of water into imbibant through diffusion as well as capillary action
(d) absorption of water

Punjab MET-2007

Ans. (c) : Imbibition involves movement of water into imbibant through diffusion as well as capillary action.

49. Which of the following is not a function of water in cell?
(a) It provides energy for chemical reaction
(b) It act as a solvent
(c) It provides a medium for chemical reaction
(d) It release hydrogen ions on ionization

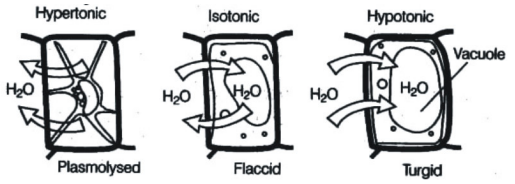
JCECE-2003

Ans. (a): It provider energy for chemical reaction is not a function of water in cell because energy for chemical reactions cell is provided by ATP.

50. Choose the wrong statement
(a) Cells swell in hypertonic solutions and shrink in hypotonic solution
(b) Water potential is the kinetic energy of water which helps in the movement of water
(c) The absorption of water by seeds and dry wood takes place by a special type of diffusion called imbibition
(d) Solute potential or Ψ_s is always negative
(e) Less than 1% of the water reaching the leaves is used in photosynthesis and plant growth

Kerala PMT-2014

Ans. (a) : Hypertonic solution is having lower water potential as compared to the cytoplasm of the cell. When a cell is placed in hypertonic solution, the water moves out of the cell, causes the cell to shrink.
Hypotonic solution is having higher water potential as compared to the cytoplasm of the cell. When a cell is placed in hypotonic solution, the water moves into the cell, causes the cell to swell.



51. Select the matched ones.

i.	**Guttation**	**Water loss in its liquid phase**
ii.	**Adhesion**	**Mutual attraction between water molecules**
iii.	**Imbibition**	**absorption of water by dry wood**
iv.	**Hypotonic solution**	**cells shrink**

(a) (i), (ii) and (iii) only
(b) (ii) and (iv) only
(c) (iii) and (iv) only
(d) (ii) (iii) and (iv) only
(e) (i) and (iii) only

Kerala PMT-2013

Ans. (e) : Correct match-

Guttation	Water loss in its liquid phase
Adhesion	Attraction of water molecules to surface
Imbibition	Absorption of water by dry wood
Hypotonic solution	Cell swell

C. Water Potential

52. Water potential of pure water at standard temperature is _____
(a) 0 (b) > 1
(c) < 1 (d) ∞

AP EAMCET-03.09.2021 Shift-II
MHT CET-08.10.2020 Shift-I
KVPY (SA)-2018 / NEET-2017
Assam CEE-2014 / Manipal - 2001 / AIPMT-1998

Ans. (a) : Water potential equation ,

$$\psi = \psi_s + \psi_p$$

Water potential (ψ) = Free energy water
By convention, at standard temperature, the water potential of pure water which is not any pressure is taken to be zero.
Solute potential (ψ_s) = Solute concentration (Osmotic potential)
Pressure potential (ψ_p) = Physical pressure on solution
Turgor pressure (Plants)
- Pure water ; $\psi_p = 0$ MP_a
- plant cells ; $\psi_p = 1$ MP_a

53. Water movement between cells is due to
(a) T.P. (b) W.P.
(c) D.P.D. (d) incipient plasmolysis

JCECE-2005 / Punjab MET-2004
Manipal-2000 / AIPMT-1992
Punjab MET-2003, 1999

Ans. (c) : Water movement between cell is due to DPD. In the DPD water molecules flow higher concentration to lesser concentration because the net force by which water enters into a cell is equal to the difference of osmotic pressure and turgor pressure.

DPD = OP – TP

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54. Water potential is equal to solute potential in the following:

(a) A cell soaked in isotonic solution
(b) A cell soaked in hypertonic solution
(c) A cell soaked in hypotonic solution
(d) A cell with incipient plamolysis

AP EAPCET-23.05.2023, Shift-II

Ans. (b) : Water potential is equal to solute potential when if a cell soaked in hypertonic solution and it also equal at atmospheric pressure, there is no hydrostatic pressure (pressure potential) on the water in the solution.

55. Addition of more solutes in a given solution will:

(a) not affect the water potential at all
(b) raise its water potential
(c) lower its water potential
(d) make its water potential zero

NEET-2022

Ans. (c): The addition of solutes to water lowers its potential (makes it more negative), and the increase in pressure increases its potential (makes it more positive). All solution at atmospheric pressure have a negative values. This means that they have a lower water potential than water.

56. The magnitude of increment in water potential in a turgid cell is called _____

(a) Solute potential (b) Pressure potential
(c) Water potential (d) Osmotic potential

AP EAMCET-03.09.2021 Shift-II

Ans. (b) : The solute potential is negative and the pressure potential is positive. In a fully turgid cell, the solute potential is equal to pressure potential. If water enters into a cell, hydrostatic pressure develops and the cell becomes turgid. The magnitude of increase in water potential in a turgid cell is called pressure potential.

57. When the value of water potential decreases related to water potential pressure?

(a) When the value of Ψ_P is positive
(b) When the value Ψ_P is 0
(c) When the value of Ψ_P is negative
(d) When the value of Ψ_P is constant

GUJCET-2019

Ans. (c) : Water potential we–

$$\psi_w = \psi_p + \psi_s$$

ψ_w = Water potential

ψ_p = Pressure potential

ψ_s = Solute potential

If in equation, ψ_p (pressure potential) is –ve then water potential decrease (–ve).

58. Two potato pieces A and B weighing 5 grams each were soaked in 0.1M and 0.5M sucrose solutions respectively. After an hour 'A' weighed 5.5 grams and B 4.5 grams. Reasons for the change in weights of A and B.

(A) Chemical potential of water is high in A than B
(B) Osmotic potential is high in B than A
(C) Turgor pressure is high in A than B
(D) Pressure potential in 'A' is 'O'
Chose the correct answer :
Options :

(a) A, B, C, D (b) A, B, C
(c) B, C, D (d) B, D

AP EAMCET-28.04.2017 Shift-I

Ans. (b) : Solution A is a hypotonic solution and solution B is a hypertonic in respect to potato, so when 5 gm weighted piece of potato put into hypotonic solution their weight is increase due to water enters into potato cells while in hypertonic solution the cells are shrinked and their weight is decreased.
The others reason for the change in weights of A and B are:
(i) Chemical potential of water is high in A then B.
(ii) Osmotic potential is high in B than A
(iii) Turgor pressure is high in A than B.

59. The osmotic potential and pressure potential of three cells (A, B, C) located in different parts of an actively transpiring plant are given below.

Cell	Osmotic Potential (MPa)	Pressure (MPa)
A	– 0.87	0.44
B	– 0.92	0.34
C	– 0.68	0.27

identify these three cells as root hair, root cortical and leaf mesophyll cells respectively. The correct answer is

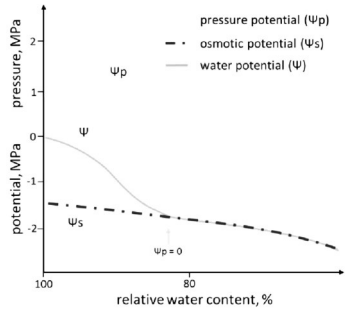
(a) A,B, C (b) A, C, B
(c) C, A, B (d) B, C, A

Manipal-2009
AP EAMCET-2011, 2009

Ans. (c) : The calculated values of water potential for three cells.
Formula –

$$\psi = \psi_P + \psi_S$$

ψ = Water potential
ψ_P = Pressure potential
ψ_S= Solute potential.
A = – 0.87+0.44= –43
B = – 0.92+0.34= –58
C = – 0.68+0.27= –41
Thus water will flow from c to A to B. This indicates that cell C must be root hair, A must be root cortex and B must be leaf mesophyll.



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60. Which of the following has the highest water potential?

(a) 1 M salt solution (b) 1 M sugar solution
(c) Distilled water
(d) 1 M sugar solution with 2.3 bars pressure applied on it

CG PMT-2011
CMC Vellore-2007

Ans. (c) : The largest water potential any volume of water can have, if only standard atmospheric pressure is being applied to that particular volume of water. Distilled water has the greatest potential to move and displace any other object.

61. Endosmosis of water occurs when in comparison with the outer solution the water potential of cell sap is

(a) higher (b) lower
(c) equal (d) None of these

Haryana PMT-2011

Ans. (b) : Water in a plant always moves from an area of high water potential to an area of low water potential for endosmosis to occur, the water potential inside the cell must be less then the water potential around it. **Endosmosis;**-Endosmosis is the process by which water or solute will move inside the cell. This happens because the solute concentration of the surrounding solution is lower than that inside the cytoplasm.

62. Which one is a colligative property ? (1) Osmotic pressure (2) Vapour pressure (3) Cohesion force (4) Surface tension

(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (b) : A property which is due to number of particles per volume as vapour pressure or osmotic pressure of a solution is known as colligative property.
The colligative property is the property which depends only on the number of solute particles present in the solution and not on the nature of the solute particles.

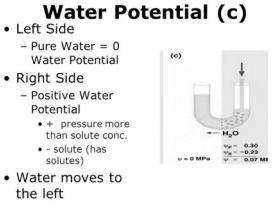
63. Which one is incorrect statement?

(a) Movement of water is expressed in terms of free energy
(b) Free energy determines the direction by which physical and chemical changes should occur
(c) Water potential is the sum of free energy of water molecules in pure water and in any other system
(d) Water potential of pure water is zero

J&K CET-2009

Ans. (c) : The water potential (ψ_w) in a plant cell or tissue is equal to the algebraic sum of the solute potential (ψ_s) due to dissolved solutes and the pressure potential (ψ_p).

$$\psi_w = \psi_s + \psi_p$$



64. Which one of the following denotes the water potential of the mesophyll cell in wilted condition?

(a) Equal to the value of osmotic potential
(b) Equal to the value of pressure potential
(c) Greater than the value of its osmotic potential
(d) Equal to zero

BCECE-2010
AP EAMCET-2007

Ans. (a) : The Osmotic potential becomes equal to the water potential of mesophyll cell valve which show in the wilted condition. The water potential of the soil is so low that plants cannot regain Turgor pressure even if all water loss through transpiration ceases. Hence the water potential of the soil is less than or equal to the osmotic potential of the plant.
Due to wilting the water potential becomes equal to osmotic potential.

65. Cell A and cell B are adjacent plant cells in cell A ψ_s = –20 bars and ψ_p = 8 bars. In cell B, ψ_s = –12 bars and ψ_p = 2 bars. Then.

(a) There is no movement of water between cell A and cell B
(b) Water moves from cell A to cell B.
(c) Equal amount of water is simultaneously exchanged between cell A and cell B.
(d) Water moves from cell B to cell A.

Karnataka CET-2010

Ans. (d) : Water potential can be calculated by adding solute potential and pressure potential.
Water always move from higher water potential to lower water potential.
Water potential = Osmotic potential + Pressure potential

$$\psi = \psi_s + \psi_p$$

For cell A, ψ_A = –20 + 8 = – 12 bars
For cell B, ψ_B = –12 + 2 = – 10 bars

$$\psi_B > \psi_A \text{ i.e., } -10 > -12$$

So, movement of water will occur from cell B to cell A.

66. The values of osmotic potential (π) and pressure potential (ρ) of cells A, B, C and D are given below:

	π	ρ
Cell A	**- 1.0**	**0.5**
Cell B	**- 0.6**	**0.3**
Cell C	**- 1.2**	**0.6**
Cell D	**- 0.8**	**0.4**

Identify the correct sequence that shows the path of movement of water from among the following:

(a) D→C→A→B
(b) B→D→A→C
(c) B→C→D→A
(d) C→B→A→D

AP EAMCET-2005

@apna_pdf

Ans. (b) : Water potential equation,

$$\psi = \psi_s + \psi_p$$

$\because \quad \psi = \pi + \rho$

For cell A,

$$\psi_A = -1 + 0.5 = -0.5$$

For cell B,

$$\psi_B = -0.6 + 0.3 = -0.3$$

For cell C,

$$\psi_C = -1.2 + 0.6 = -0.6$$

For cell D,

$$\psi_D = -0.8 + 0.4 = -0.4$$

Hence, path movement of water is correct sequence,

$$B \rightarrow D \rightarrow A \rightarrow C$$

67. Identify the correct relationship with reference to water potential of a plant cell.

(a) $\psi_w = \psi_m + \psi_s + \psi_p$

(b) $\psi_w = \psi_m + (\psi_s - \psi_p)$

(c) $\psi_w = \psi_m - (\psi_s + \psi_p)$

(d) $\psi_w = \psi_m - \psi_s - \psi_p$

Karnataka CET-2006

Ans. (a) : $\psi_w = \psi_m + \psi_s + \psi_p$

The difference between the free energy of a water molecule in pure water and the energy of water in any other system is termed as water potential.

The water potential is calculated by the sum of osmotic or solute potential and pressure potential.

The matrix potential is a minor factor in calculation of water potential and can be neglected.

68. 'A' and 'B' are the two adjacent living cells. The cell 'A' has solute potential (ψ_s) of –9 bars and pressure potential (ψ_p) of 4 bars, whereas cell 'B' has solute potential (ψ_s) of –8 bars and pressure potential (ψ_p) of 5 bars. What will be the direction of water movement between these cells?

(a) Cell A to Cell B

(b) Cell B to Cell A

(c) Do not move in any direction.

(d) Moves in both the directions.

Karnataka CET-2016

Ans. (b) : Water always move from higher water potential to lower water potential.

Water potential = Osmotic potential + Pressure potential

$$\psi = \psi_s + \psi_p$$

For cell A, $\psi_A = -9 + 4 = -5$ bars

For cell B, $\psi_B = -8 + 5 = -3$ bars

$$\psi_B > \psi_A \text{ i.e., } -3 > -5$$

So, movement of water will occur from cell B to cell A.

69. The real forces responsible for the movement of water from one cell to another cell is mainly

(a) Osmotic Pressure (OP)

(b) Turgor Pressure (TP)

(c) Diffusion Pressure Deficit (DPD)

(d) Imbibition

JIPMER-2004

Ans. (c) : The net force with which water is drawn into a cell is equal to difference off OP and TP, known as diffusion pressure deficit or suction pressure. DPD of pure water is maximum (= 1236 atm) solvent moves from cell of low DPD to high DPD. DPD, or SP = OP – TP. In a plant body water moves from one region to another region; it means from high DPD to low DPD.

70. What shall be the water potential of a root hair cell absorbing water from the soil

(a) Zero (b) Less than zero

(c) More than zero (d) Infinite

AIPMT-1999

Ans. (b) : Water potential of root hair cell absorbing water from soil is less than zero.

Water potential depends on the number of molecules of water in the system. More the number of water molecule more the water potential.

- Water potential of pure water is maximum and is zero.
- The root hairs present a large surface area. The more surface area, the greater is the absorption.
- Water potential of all solution is hence negative.
- Water always moves from a solution/region of higher water potential to a region/solution of lower water potential. Hence, water potential of roots cell cannot be more than zero i.e. negative value.

71. Study the following table and identify the correct sequence of cells which shows the path of water movement between them.

Cell	Osmotic Potential (MPa)	PressurePotential (MPa)
A	–0.95	0.40
B	–0.75	0.40
C	–0.85	0.25
D	–0.65	0.25

(a) $D \rightarrow B \rightarrow C \rightarrow A$ (b) $B \rightarrow C \rightarrow D \rightarrow A$

(c) $C \rightarrow B \rightarrow A \rightarrow D$ (d) $B \rightarrow D \rightarrow A \rightarrow C$

AP EAMCET-2013, 2010

Ans. (d) : The movement of water from one cell to another cell through the plasmodesmata is called the symplast pathway.

Water potential = Osmotic potential + Pressure.

Then,

$$\psi = \psi_O + \psi_p$$

$\therefore \quad \psi_A = -0.95 + 0.40 = -0.55$ MPa

$\psi_B = -0.75 + 0.40 = -0.35$ MPa

$\psi_C = -0.85 + 0.25 = -0.60$ MPa

$\psi_D = -0.65 + 0.25 = -0.40$ MPa

The correct Sequence of cell which show the path of water movement between them is

$$B \rightarrow D \rightarrow A \rightarrow C$$

72. Whose water potential is less than water potential of root hair during the water absorption by root hair?

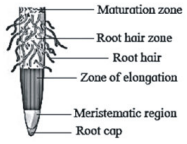
(a) Gravitational water (b) Soil solution

(c) Pure water (d) Vacuolar sap

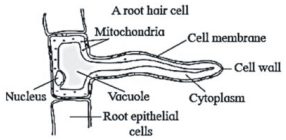
GUJCET-2011

@apna_pdf

Ans. (d): The water potential of vacuolar sap is less than water potential of root hair during the water absorption by root hair. Water always moves from area of high water potential to area of low water potential, i.e. from less negative to more negative. Water movement during water absorption by root hairs is possible if the water potential of the vacuole juice is less then the water potential of the root hair.



Root tip showing root hair zone



Structure of root hair

73. Which of the following does not affect water potential of Water?
(a) Concentration of dissolved substances.
(b) Atmospheric pressure.
(c) Gravitation.
(d) Capillarity.

GUJCET-2011

Ans. (d): Water potential is the difference between free energy of water molecules in pure from and energy of water in the solution. It depends on solute concentration, atmospheric pressure and gravitation. It is not affected by capillarity.

74. Study the following table showing the components of water potential of four cell of an actively transpiring plant.

Cell	Solute potential (MPa)	Pressure potential (MPa)
A	–0.68	0.42
B	–0.75	0.36
C	–0.83	0.47
D	–0.57	0.29

Identify the four cells as root hair, cortical cell, endodermal cell (lacking casparian strips) and pericycle cell respectively in the young root (assuming symplastic water flow through them)
(a) A, C, B, D (b) B, D, C, A
(c) D, A, C, B (d) A, D, C, B

AP EAMCET-2014

Ans. (d) : Formula for water Potential –
$\psi_w = \psi_s + \psi_p$
The movement of water in symplastic pathway occurs through, root hair → Epidermis → cortex, endodermis → pericycle → xylem.
Water potential of cell A = – 0.68 + 0.42 = –0.26
Water potential of cell B = – 0.75 + 0.36 = –0.39
Water potential of cell C = – 0.83 + 0.47 = –0.36
Water potential of cell D = – 0.57 + 0.29 = –0.28
Water always flows from higher water potential to lower water potential. So, A is root hair cell, D is cortical cell, C is endodermal cell, and B is pericycle cell.

75. Which of the following statement is correct?
(a) DPD = OP – WP (b) DPD = OP + WP
(c) DPD = WP – OP (d) DPD = TP + OP

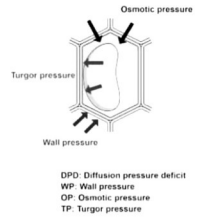
AIIMS-2014 / J&K CET-2004
Rajasthan PMT-1995

Ans. (a) : The value by which the diffusion pressure of a solution is lower than that of pure solvent is known as Diffusion Pressure Deficit. DPD or SP = OP – TP.
At the equilibrium, TP = WP.

So, $\boxed{DPD = OP - WP}$

Where, OP = Osmotic pressure
TP = Turgor pressure
WP = Wall pressure

• The term "Water potential" was given by **Slatyer and Taylor in 1960.**



(A) DPD = WP – OP
(B) DPD = OP – WP
(C) DPD = OP + WP
(D) DPD = TP + OP

76. With an increase in the turgidity of a cell, the wall pressure will
(a) fluctuate (b) remain unchanged
(c) increase (d) decrease

Manipal-2005 / Haryana PMT-2000
AIPMT-1997

Ans. (c) : With an increase in the turgidity of a cell, the wall pressure will increase. Turgidity is the state of the cell developed due to turgor pressure. Wall pressure is the pressure exerted by the cell wall on the plant cell.
→ If turgor pressure is higher than wall pressure, then the cell wall will be ruptured.

77. The potential energy of water is referred as:
(a) water potential (b) osmotic potential
(c) gravity potential (d) pressure potential

J&K CET-2005

Ans. (a) : The potential energy of water is referred as water potential. The water potential is the chemical potential of water in a system or part of a system expressed in units of pressure.

78. Consider the following statements and select the correct one:
Statement (A): Pure water has maximum water potential.
Statement (B): The osmotic potential is zero in pure water.
(a) Both statements are correct and (B) is not the reason for (A).
(b) Both statements are wrong.
(c) Both statements are correct and (B) is the reason for (A).
(d) Both statements are correct.

Karnataka CET-2013

Ans. (c) : The potential energy of water is referred as water potential. The water potential decreases with increase in solute concentration. Pure water has maximum water potential. The osmotic potential is zero in pure water because there is no solute and the pressure in the container is zero.

79. During absorption of H_2O by roots, the H_2O potential of cell sap is lower than that of:
(a) solution outside (b) pure H_2O
(c) one (d) none of above

DUMET-2004

@apna_pdf

Ans. (b) : Water potential is the potential energy of H_2O in a system compared to pure H_2O, when temperature and pressure both are kept the same. During absorption of water by roots, the water potential of cell sap is lower than that of pure H_2O and soil solution.

80. When the concentration of the solutes is low in plant cell, absorption of water is

(a) retarded (b) increased
(c) normal (d) absent

AMU-2014

Ans. (a) : When the concentration of the solutes is low in plant cell, then the cell sap is hypotonic as compared to soil solution. Water always flows from a hypotonic solution to a hypertonic solution. Hence, when the plant cell is hypotonic due to low concentration of solutes, the water flows out of the cell due to the process of exosmosis and absorption of water is retarded.

81. Movement of water through semipermeable membrane produces

(a) Wall pressure (b) Turgor pressure
(c) Suction pressure (d) Osmotic pressure

J&K CET-2013

Ans. (d) : Osmosis is a process of movement of molecules through a semipermeable membrane from a region of higher solvent concentration to lower solvent concentration. The movement of water through semipermeable membrane produces osmotic pressure. It is a colligative property and is dependent on the concentration of solute particles in the solution.

82. The correct ascending sequence of the cells with respect to their water potential is

	A	B	C	D
π	– 0.8 MPa	–1.0MPa	–0.9MPa	–0.3MPa
p	+0.4 MPa	+0.5MPa	+0.2MPa	+0.2MPa

(a) ABCD (b) CBAD
(c) CABD (d) CDBA

AP EAMCET-2015

Ans. (b) : Water potential equation,

$$\psi = \psi_p + \psi_s$$

Water potential of cell A,

$$\psi_A = -0.8 + 0.4 = -0.4\text{MPa}$$

Water potential of cell B,

$$\psi_B = -1.0 + 0.5 = -0.5\text{MPa}$$

Water potential of cell C,

$$\psi_C = -0.9 + 0.2 = -0.7\text{MPa}$$

Water potential of cell D,

$$\psi_D = -0.3 + 0.2 = -0.1\text{ MPa}$$

So, the correct ascending sequence of the cells with respect to their water potential is C, B, A, D.

83. Which of the following is the unit of measurement of water potential?

(a) Watts (b) Joule
(c) Pascal (d) Litre
(e) Cubic centimeter

CMC Vellore-2008

Ans. (c) : Pascal is the unit of measurement of water potential. Water potential is the measure of potential energy in water. Water potential is denoted by the Greek letter psi (Ψ).

84. When a solute is dissolved in pure solvent, the change in diffusion pressure called :

(a) diffusion (b) DPD
(c) osmosis (d) endosmosis

Rajasthan PMT-2001

Ans. (b) : The Diffusion Pressure Deficit (DPD) is the decrease or deficit in diffusion pressure. It is the change in diffusion pressure when a solute is dissolved in pure solvent. The diffusion pressure of a solvent in a solution is always lower than that in the pure solvent. Because of the presence of DPD, a solution will always tend to make up the deficit by absorbing water. Hence, DPD is the water absorbing capacity of a solution, and it is also called suction pressure.

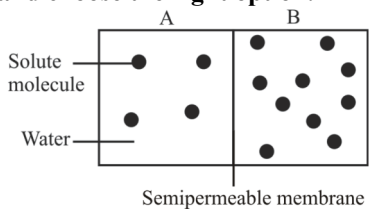
85. Two cells A and B are contigous. Cell A has osmotic pressure 10 atm, turgor pressre-7 atm and diffusion pressure deficit 3 atm. Cell B has osmotic pressure 8 atm, turgor pressure 3 atm and diffusion pressure deficit 5 atm. The result will be

(a) movement of water from cell B to A
(b) no movement of water
(c) equilibrium between the two
(d) movement of water from cell A to B

JIPMER-2011

Ans. (d) : Diffusion pressure deficit (DPD) is the force that drives water molecules to flow from a region of higher concentration to a region of lesser concentration. It is the driving force behind water absorption by cells and water moves from a region of low DPD to a region of high DPD. The DPD of cell A is 3 atm, and DPD of cell B is 5 atm. So, the result will be movement of water from cell A to B.

86. Chamber A and B are separated by a semi-permeable membrane. Study the given figure and choose the right option.



(a) Chamber A has higher water potential and water will move from A to B.
(b) Chamber B has lower solute potential and water will move from A to B.
(c) Chamber A has higher solute potential and water will move from B to A.
(d) Chamber B has lower water potential and water will move from B to A.
(e) Chamber B has higher solute potential and water will move from B to A.

Kerala PMT-2013

Ans. (a) : Water potential of pure water is zero and it decreases as the solute concentration increases. In chamber B, there are more solute particles than in chamber A. Hence, chamber A has higher water potential then chamber B, and water will move from lower concentration of solute (chamber A) to higher concentration of solute (chamber B).

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D. Transport of water and its Pathway

87. Guttation is manifestation of :

(a) osmosis (b) transpiration
(c) root pressure (d) photosynthesis

HP CET-2011 / AIPMT (Mains)-2011
Karnataka CET-2007 / BHU PMT (Screening)-2006
BVP-2003, 2005 / VMMC-2005
Haryana PMT-2004 / AMU-2004
Manipal-2003 / BHU PMT-2001 / AIPMT-1992

Ans. (c) : The root pressure is maximum which forces the water upward through xylem elements and eventually exudes in the form of drops through hydathodes. At leaf margins.
Loss of water in a form of liquid from leaf surface is called guttation.

88. Who proposed the Cohesion Theory of ascent of sap?

(a) Strasburger (b) Godlewski
(c) Western (d) Dixon and Jolly

BVP-2014 /CMC Vellore-2012
HP CET-2011 / BVP-2010
Kerala PMT-2009 / BCECE-2006
VMMC-2005 / AMU-2004
BCECE-2001 / Rajasthan PMT-2000, 1995

Ans. (d) : Dixon and Jolly conceived the concept of a Cohesion tension system for the ascent of sap in 1894. The theory explains that the ascent of sap is due to the transpirations pull to tension, water cohesion and hydration of cell wall.
According to Godlewaski theory, the flow of water is due to pumping action of the wood parenchyma and medullary ray cells.

89. In plants, water supply is due to

(a) Osmosis (b) Imbibition
(c) Guttation (d) Adhesion force

VMMC-2012 / BCECE-2010
UP CPMT-2008 / MGIMS Wardha-2008
Rajasthan PMT-2008 / CG PMT-2008
BHU PMT (Screening)-2006

Ans. (a) : In plants, water supply is due to osmosis.
Root hairs function as tiny osmotic systems. Each root hair has a thin permeable cell wall, a semipermeable cytoplasm and an osmotically active cell sap present in the central vacuole.

90. Guttation is the process of elimination of water from plants through

(a) Stomata (b) Hydathodes
(c) Lenticels (d) Wounds

MHT CET-2019 / UP CPMT-2010
AFMC-2010 / J&K CET-2009
Punjab MET-2008 /BCECE-2007
UP CPMT-2005 / BVP-2002

Ans. (b) : Guttation is the process of elimination of water from plants. It occurs from the pores in leaves through which water comes out in the form of droplets or a specialized multicellular structure in leaves. Which excretes water droplets. The pores are called hydathodes.

91. Match column-I with column-II. Select the option with correct combination.

Column-I	Column-II
1. Hypertonic	p. Two molecules move in the same direction across membrane.
2. Capillarity	q. External solution is more concentrated than cell sap.
3. Symport	r. Water loss in the form of droplets.
4. Guttation	s. Ability of water to rise in thin tubes.

(a) 1-q, 2-s, 3-p, 4-r (b) 1-q, 2-s, 3-r, 4-p
(c) 1-q, 2-r, 3-p, 4-s (d) 1-q, 2-p, 3-s, 4-r

Karnataka CET-20.05.2023

Ans. (a) :

1.	Hypertonic	q.	External solution is more concentrated than cell sap
2.	Capillarity	s.	Ability of water to rise in thin tubes
3.	Symport	p.	Two molecules move in the same direction across membrane
4.	Guttation	r.	Water loss in the form of droplets

92. A : Sedges and grasses
B : Trees
C : Phytoplankton
D : Free floating plants
Arrange the above in a sequence in primary succession in water

(a) $B \rightarrow A \rightarrow D \rightarrow C$ (b) $C \rightarrow D \rightarrow A \rightarrow B$
(c) $A \rightarrow C \rightarrow D \rightarrow B$ (d) $D \rightarrow C \rightarrow A \rightarrow B$

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : Phytoplankton → Free floating → Sedges and grass → Trees.
Primary succession is a type of ecological succession.

93. The physiological and morphological phenomena that happen, when bulliform cells absorb water and undergo water stress respectively.

(a) Flaccid: Leaf surface show no change.
Turgid: Leaf surface bend backward.
(b) Plasmolysed: Inward curling of leaf.
Turgid: No change.
(c) Plasmolysed: Inward curling of leaf.
Flaccid: Leaf surface exposed.
(d) Turgid: Leaf surface exposed.
Flaccid: Inward curling of leaf.

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : When bulliform cells absorb water, they become turgid and the leaf surface is exposed. When they are flaccid due to water stress, they make the leaves curl inwards to minimize water loss.
• Plasmolysis is the process of a cell losing water and its contends shrinking away from the cell wall. It is opposite of turgidity.

94. Consider the following tissues in the stelar region of a stem showing secondary growth.

(A) Primary xylem
(B) Secondary xylem
(C) Primary phloem
(D) Secondary phloem

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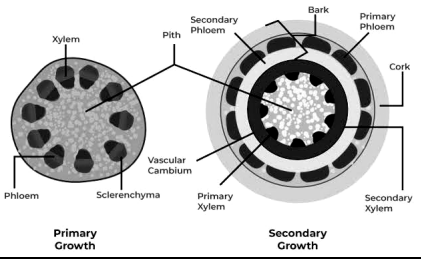
Arrange these in the correct sequence of the their position from pith towards cortex.

(a) (A), (B), (C), (D) (b) (B), (A), (D), (C)
(c) (A), (B), (D), (C) (d) (B), (A), (C), (D)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : The xylem formed during the primary growth from pro cambium of root and shoot apex.

- Secondary xylem is consists of living and non-living components. It is called wood.
- Primary phloem produced by the primary meristem of a vascular plant.
- Secondary phloem forms from vascular cambium during secondary growth.
- The sequence of tissue in the stelar region of the stem showing secondary growth from pith toward cortex is Primary xylem → Secondary xylem → Secondary phloem → Primary phloem.



95. The movement of water through the cell wall is known as _____

(a) Tonoplast (b) Apoplast
(c) Plasmolysis (d) Symplast

AP EAPCET-12.07.2022 Shift-I

Ans. (b) : The movement of water through the cell wall is known as the apoplast. The apoplast is the network of cell walls and intercellular spaces that water and solutes can move through without crossing a plasma membrane.

96. When a carrier protein facilitates the movement of two molecules across the membrane in same direction, it is called:

(a) Uniport (b) Transport
(c) Antiport (d) Symport

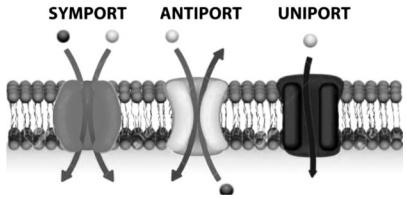
NEET (Re-Exam)-04.09.2022

Ans. (d) : Some carrier proteins allow transport only if two types of molecules move together called contransport. It is divided into symport and antiport method.

Antiport – Antiport occurs when two chemicals travels in opposite directions across a cell membrane.

Symport- Symport occurs when twop substances travel in the same direction across a cell membrane.

Uniport- Uniport occurs when a single substances travels in a single direction through a cell membrane.

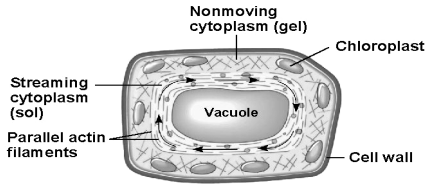


97. Which of the following is not observed during apoplastic pathway ?

(a) Apoplast is continuous and does not provide any barrier to water movement
(b) Movement of water occurs through intercellular spaces and wall of the cells
(c) The movement does not involve crossing of cell membrane
(d) The movement is aided by cytoplasmic streaming

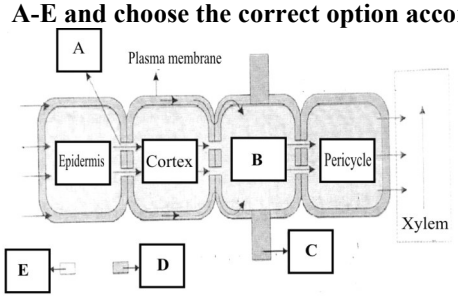
NEET-2022

Ans. (d) : Inside a plant the apoplast is the space outside the plasma membrane with in which material can diffuse freely. It is interrupted by the casparian strip in roots, by air spaces between plant cells and by the plant while. Apoplast is continuous and does not provide and barrier to water movement. The movement does not involve crossing of cell membrane.



(c) Cytoplasmic streaming in plant cells

98. In the given flow chart, the pathway of water movement is shown from soil to xylem. Identify A-E and choose the correct option accordingly?

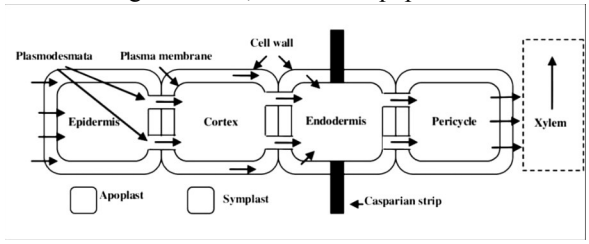


(a) A-Stomatal pore, B-Endodermis, C-Casparian strip, D-Symplast, E-Apoplast
(b) A- Plasmodesmata, B-Palisade, C-Medullary rays, D-Symplast, E-Apoplast
(c) A-Plasmodesmata, B-Endodermis, C-Casparian strip, D-Apoplast, E-Symplast
(d) A-Stomatal pore, B-Guard cell, C-Medullary, D-Apoplast, E-Symplast

AP EAMCET-05.10.2021 Shift-I

Ans. (c) : A- Plasmodesmata, B-Endodermis, C-Casparian strip, D- Apoplast, E- Symplast

During the transport of water from soil to xylem, water moves through mainly two channels, i.e, symplast and apoplast. Symplast when water moves between adjacent cell through cytoplasmic concention and when water moves through cell wall, it is called apoplastic movement.



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99. Which one of the following processes maximally facilitates the ascent of sap?

(a) Guttation (b) Photosynthesis
(c) Photorespiration (d) Transpiration

KVPY (SA)-2021

Ans. (d) : The process of transpiration maximally facilitates the ascent of sap. Transpiration helps the ascent of sap by producing a suction force acting from the top of the plant.

100. Assertion (A) : In Apoplast pathway, water movement is ultimately symplastic in endodermis.
Reason (R) : Root endodermal cells are suberized.

(a) A is correct but R is wrong.
(b) A is wrong but R is correct.
(c) Both A and R are correct and R is not correct explanation for A.
(d) Both A and R are correct and R is the correct explanation for A.

AP EAMCET-03.09.2021 Shift-II

Ans. (d) : The apoplastic movement of water through the root layers is ultimately symplastic in the endodermis due to the presence of casparian strips. The root endodermal cell undergoes two states of differentiation, casparian strip formation and suberization.

101. What is NOT true about cohesion-tension theory of translocation of water in plants?

(a) Transpiration pull is transmitted downward from leaf, stem to root.
(b) Living cells of roots play an active role and ascent of sap occurs actively.
(c) There is a force of attraction between water and lignified walls of xylem cells.
(d) Water molecules have strong mutual attraction so they cannot be easily separated.

MHT CET-08.10.2020 Shift-I

Ans. (b) : The cohesion- tension theory explains the ascent of sap through the xylem tissues. This theory was put forward by Dixon and Jolly (1894). This theory is based on two principles, i.e., cohesion and adhesion, and transpiration pull. A strong force of attrition between water molecules is called cohesive force, while a strong force of attraction between water molecules and the lignified wall of xylem vessels is called adhesive force. The transpiration pull developed in the leaf vessel s transmitted down to the root and thus accounts for the ascent of sap. The ascent of sap is passive and occurs along the concentration gradient.

102. Attraction of water molecules to polar surface called

(a) Cohesion (b) Adhesion
(c) Surface tension (d) Capillary force

AP EAMCET-25.09.2020 Shift-II

Ans. (b) : Adhesion is the property of attraction of water molecules towards polar surfaces, such as the surface of tracheary elements. Cohesion is attraction between water molecules. These two forces combine together to pull up the water column in xylem. Capillarity is tendency of a liquid to rise in a capillary tube.

103. Arrange the following in the pathway of water movement in the root.

I. Cortex
II. Epidermis
III. Pericycle
IV. Endodermis

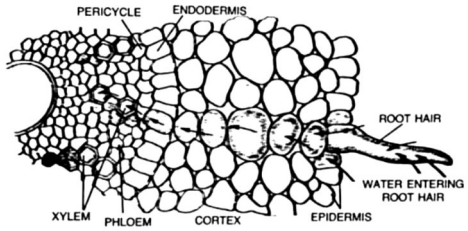
The correct answer is

(a) I, II, IV, III (b) II, I, IV, III
(c) II, III, I, IV (d) I, II, III, IV

TS EAMCET-08.05.2019 Shift-I

Ans. (b) : The correct sequence of water movement in the root is (Epidermis → Cortex → Endodermis → pericycle).

- Epidermis is the outermost layer of root that protects the inner layer of cells.
- Cortex is composed of parenchyma cells that allow the movement of water.
- Endodermis the innermost layer that regulates the flow of water.

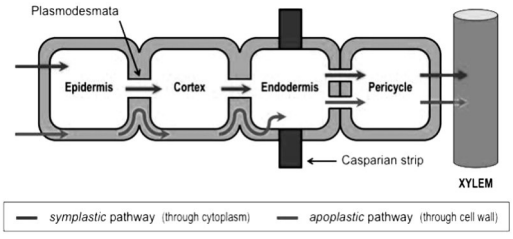


104. Which of the following is correct about symplast?

(a) Living continuum
(b) Cell wall and intercellular space
(c) Non-Living continuum
(d) None of these

AIIMS-25.05.2019 Shift-I

Ans. (a) : The symplastic system is the system of interconnected protoplasts neighboring cells are connected through cytoplasmic strands that extend through plasmodesmata symplast cell have more than one nucleus. During the symplastic movement, water travels through the plasmodesmata. As the symplastic system is the system of interconnected protoplast, it is considered as a living continuum.



105. Which of the following is not a feature of active transport of solutes in plants ?

(a) Requires ATP
(b) Occurs against concentration gradient
(c) Non-selective
(d) Occurs through membranes

NEET (Odisha)-2019

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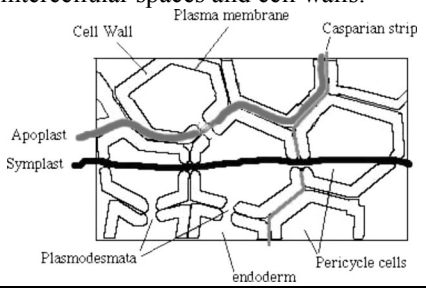
Ans. (c) : Non–selective is not a feature of active transport of solutes in plants Active membrane proteins, like enzymes, the carrier proteins are very specific (i.e., selective) in what they carry across the membranes.

- Active transport, i.e. the uphill transport of molecules uses energy (ATP) to pump molecules against a concentration gradient. It is highly selective.

106. Assertion (A) : Apoplastic path of water is considered to be non- living path.
Reason (R) : In apoplastic pathway. water does not move through intercellular spaces or through the space between cell wall and plasma membrane.
Which of the following is true?
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and(R) are true. but (R) is not the correct explanation of (A)
(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

TS EAMCET-03.05.2018 Shift-I

Ans. (c) : Apoplast is non- living and involves cell walls and intercellular spaces. Apoplast consists of adjacent cells that are continuous except at the casparian strips in the endodermis. The movement of water is through intercellular spaces and cell walls.



107. Continuous upward flow of water stream in tall trees is maintained due to____
(a) Guttation and transpiration
(b) Transpiration pull only
(c) Cohesive force between H_2O molecules only
(d) Cohesive force between H_2O molecules and transpiration pull

MHT CET-2018

Ans. (d) : Continuous upward flow of water stream in tall tree is maintained due to cohesive force between H_2O molecules and transpiration pull. Water moves up in plant due to phenomenon called transpiration.

108. Find correct statements from the following
(A) Protein transporters are responsible for maximum rates of transport under saturated state
(B) Translocation of substances in bulk flow requires hydrostatic pressure gradient
(C) Root pressure plays greatest contribution for upward movement of water in tall plants
(D) Transport proteins of endodermal cells are control points for active transport of ions in two directions
(a) A, C (b) A, B
(c) C, B (d) A, D

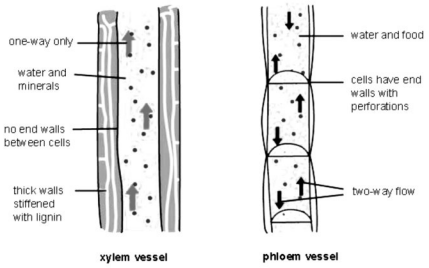
AP EAMCET-25.04.2018 Shift-I

Ans. (b) : Protein transporters are specialized membrane proteins that facilitate the movement of molecules across the cell membrane, and they can operate at very high rates, up to several million molecules per second. Bulk flow is the movement of fluids driven by pressure gradients, and it occurs in both animals and plants. Translocation of water and solutes in the xylem is driven by the hydrostatic pressure generated by the transpiration of water from leaves.

109. Water in plants is transported by:
(a) Cambium (b) phloem
(c) xylem (d) epidermis

SRM JEEE-2018 / JIPMER-2006 / AIPMT-1989

Ans. (c) : Water in plants is transported by xylem. Water from the soil enters the root hairs by moving along a water potential gradient and into the xylem through either the applets or symplast pathway. It is carried upward through the xylem by transpiration, and then passed into the leaves along another water potential gradient.



110. How much water is absorbed in 15 hours by a mustard plant having 2 kg wt.
(a) 2 kg (b) 6 kg
(c) 4 kg (d) 12 kg

GUJCET-2018

Ans. (b): A mustard plant absorbs water approximately equal to its own weight in about 5 hrs. This water is absorbed through root and evaporated through stomata. So according to this mustard plant of 2 kg will absorb 2kg of water in water in 5hrs, and total 6 kg in 15hrs.

111. Match the following lists

List-I	List-II
(A) Plasmolysis	**(I) Movement of water occurs exclusively through the intercellular spaces and the walls of the cells**
(B) Translocation	**(II) The bulk movement of substances through vascular tissues of plants**
(C) Symplastic	**(III) Water travels through the cells- their cytoplasm; intercellular movement is through plasmodesmeta**

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(D) Apoplastic — (IV) Water moves out of the cell and the cell membrane of a plant cell shrinks away from its cell wall

(V) Symbiotic associations of a fungus with a root system. Fungus provides minerals and water to the roots

	A	B	C	D
(a)	III	II	V	I
(b)	IV	III	V	II
(c)	II	III	I	IV
(d)	IV	II	III	I

TS EAMCET-12.05.2017

Ans. (d) : Plasmolysis – Water moves out of the cell and the cell membrane of a plant cell shrinks away from its cell wall

- Translocation – The bulk movement of the substance through vascular tissues of plants
- Symplastic – Water travels through the cells their cytoplasm; intercellular movement is through
- Apoplastic – Movement of water occurs exclusively through the intercellular spaces and the walls of the cells

112. Which of the following helps in ascent of sap?

(a) Root pressure (b) Transpiration
(c) Capillarity (d) All of these

SRM JEEE -2017
AIIMS-2007

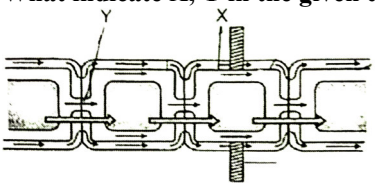
Ans. (d) : The process of translocation of water and minerals from the root tip to the stem top of the plant is called ascent of sap.

Root pressure- Water absorption behind transpiration water deficit occurs in plant which leads to decrease in rate of transpiration.

Capillary force theory – The water molecules are only held together by capillary tension but does not explain its upward translocation.

Transpiration pull theory – It is the force which upward the water from root to leaves. It is also known as suction force theory.

113. What indicate X, Y in the given diagram?

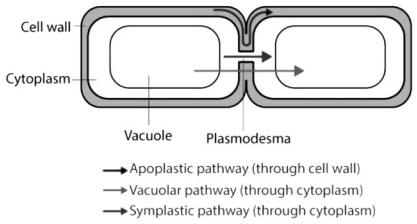


(a) X-Cell surface membrane Y-Plasmodesma
(b) X-Plasmodesma Y-Tonoplast
(c) X-Cell surface membrane Y-Cytoplasm
(d) X-Plasmodesma Y-Cell surface membrane

GUJCET-2017

Ans. (a) : The given diagram represents the symplastic pathway of water movement. During the symplastic movement water travels through the plasmodesmata.

The symplast consist of an entire network of cell cytoplasm which is interconnected by plasmodesmata. Hence, In the diagram, X is the cell surface membrane and Y is the plasmodesmata.

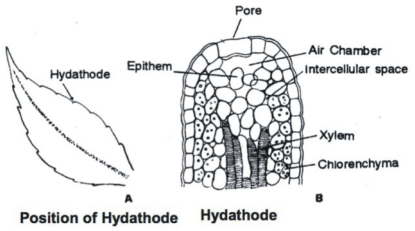


114. Loss of liquid water by guttation occurs through:

(a) hydathodes (b) stomata
(c) cuticle (d) bark

BHU PMT-2004

Ans. (a) : Guttation is loss of water in liquid from uninjured part of plants. Guttation is the phenomenon of loss of water from small pores which occurs on the margin of leaves known as hydathodes.



115. Water enters from soil into the root hairs due to

(a) turgor pressure of roots hair
(b) osmotic pressure of root hair
(c) suction pressure
(d) diffusion pressure

BHU PMT (Screening)-2011

Ans. (b) : Water enters from soil into the root hairs due to osmotic pressure of root hair.

For osmosis to occur there must be a higher concentration of solution, e.g. mineral ions inside the cell then in the soil water surrounding the roots. A high concentration of solutes means a there is a low concentration of water in the root hair cells compared to the soil water.

116. Cells are connected by plasmodesmata, the system is called

(a) symplast (b) protoplast
(c) chloroplast (d) imbibitions

WB JEE-2012
VMMC-2010

Ans. (a) : Plasmodesmata are intercellular pores connecting adjacent plant cells allowing membrane. Cells are connected by plasmodesmata the system is called symplast. Symplast present inside the cell membrane of the cell.

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117. A plant with specialized epidermis for absorption of moisture from the atmospheres is:
(a) Avicinnia (b) Rhizophora
(c) Vanda (d) Jussiaea

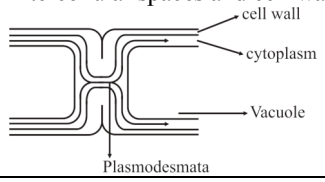
AP EAMCET-2002

Ans. (c) : Vanda is a type of orchid that is an epiphyte plant which has specialized epidermis absorb moisture from air.

118. The term apoplast signifies
(a) cell wall, intercellular space and water-filled channels
(b) protoplasts interconnected by plasmodesmata
(c) cell wall, cytoplasm and central vacuole
(d) None of the above

CG PMT-2011

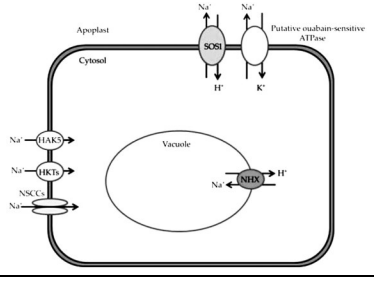
Ans. (a) : The term 'apoplast' refers to the continuous system of interconnected cell walls, extracellular spaces, and intercellular spaces within plant tissues. It is one of the transport pathways for water and solutes in plants.
Water and solutes pass through the extracellular gaps and non-living parts of the plants cell-walls in the apoplast route.
Passive water absorption involves apoplast movement of water through intercellular spaces and cell wall of cells.



119. By which mechanism, the salt resistant Plants can get rid off excess Na- ions to the outer side, through the roots?
(a) H^+ ATPase uniport system
(b) Na^+ ATPase uniport system
(c) $H^+ - Cl^-$ symport system
(d) $Na^+ - H^+$ antiport system

Manipal-2010

Ans. (d) : The salt resistant plants get rid of excess Na^+ ions to outside through the roots by $Na^+ - H^+$ antiport system, i.e. Na^+ ions move out through roots and H^+ ions move in.



120. Excess of one of them act as antitranspirant
(a) H_2 (b) CO_2
(c) SO_2 (d) O_2

Haryana PMT-2011

Ans. (b) : Antitranspirants are the chemical compounds or materials which are applied to the outer layer of leaves in order to reduce transpiration. Carbon dioxide concentration aspects stomatal opening in closed stomata external carbon dioxide has no effect.

121. When the temperature of soil is 0°C then the water absorption
(a) Increases
(b) Decreases
(c) Not affected
(d) Soil will lose capillary H_2O

Haryana PMT-2011

Ans. (b) : Increase in soil temperature up to about 30°C favours water absorption. At higher temperature water absorption is decreased. At low temperature also water absorption decreases so much so that at about 0°C.

122. The water vapour of a plant sample or water solution is measured by
(a) Auxanometer (b) Psychrometer
(c) Osmometer (d) Photometer

Haryana PMT-2011

Ans. (b) : The water vapour of a plant sample or water solution is measured by Psychrometer.
- Auxanometer - Measured growth in plant
- Osmometer - Measures the osmotic pressure of a solution.
- Photometer - Measures the strength of electromagnetic radiation.

123. Root pressure is measured by
(a) Potometer (b) Barometer
(c) Manometer (d) Auxanometer

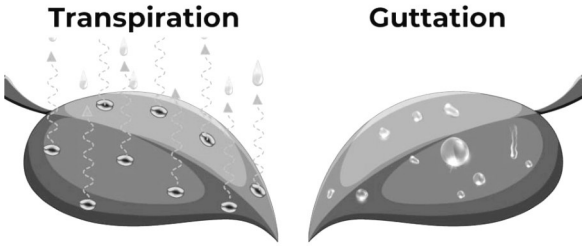
Manipal-2011
Uttarakhand-2005

Ans. (c) : Root pressure is measured by manometer. Root pressure is the pressure caused due to the active absorption of mineral salts leading to a passive flow of water into the roots from the soil solution.

124. Water lost in guttation is :
(a) Pure water (b) Impure water
(c) In vapour form (d) Either a and b

AMU-2005
Manipal-2004
Uttarakhand PMT-2004

Ans. (b) : Guttation is referred to as a process of secretion of water in the form of water droplets from the pores of vascular plants. The water lost in this process is a dilute solution containing mineral salts like potassium. Guttation is the loss of water that is impure.

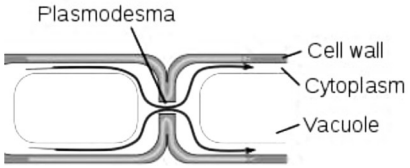


125. Plasmodesmata (1) also called tight junctions (2) increase area of absorption (3) are barriers for diffusion (4) five finger like folding
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011

@apna_pdf

Ans. (d) : Plasmodesmata are called tight junctions which are barriers for diffusion. Plasmodesmata are structurally different from gap junctions but serve essentially the same functions.



126. When water enters in roots due to diffusion, it is termed as :

(a) Osmosis (b) Passive absorption
(c) Active absorption (d) Imbibition

BHU PMT-2001

Ans. (b) : Passive absorption occurs when the rate of transpiration is typically higher than normal.

- Rapid evaporation of water from the leaves during transpiration causes a buildup of water in the xylem of the leaves, which results in a buildup of pressure.
- When the water in the xylem of roots is stressed, it is upward to reach the transpiring surfaces.
- The force necessary for this water entry is generated in the leaves as a result of rapid transpiration, and as a result, the root cells remain passive throughout this pressure.

127. The water which cannot be absorbed by the plants is termed as:

(a) Field capacity (b) Holard
(c) Hygroscopic water (d) Capillary water

JIPMER-1998

Ans. (c) : The water which cannot be absorbed by the plants is termed as hygroscopic water.

This water is hold up in the soil particle with such a great imbibitions force, that it cannot be separated from it for the use of the plant. This is called hygroscopic water, which also cannot be absorbed from the soil by the plants.

• Each soil particle is surrounded by a loose film of water; this film is attracted by the capillary force to the soil particle, and such water film is called capillary water.

128. The cytoplasm of adjacent plant cells is connected to each other by

(a) Plasmalemma (b) Desmosome
(c) Plasmodesmata (d) Plasmotubule

DUMET-2010
AIPMT (Screening)-2010

Ans. (c) : The cytoplasm of adjacent plant cells is connected to each other by plasmodesmata.

Plasmodesmata are small channels that directly connect the cytoplasm of neighboring plant cells to each other establishing living bridges between cells.

Plasmalemma is a semipermeable membrane that encloses the cells cytoplasm and nucleoplasm and separates the cell from the extracellular.

129. The function of a vessel is:

(a) Conduction of food
(b) Conduction of water and minerals
(c) Conduction of hormones
(d) All of the above

JCECE-2005

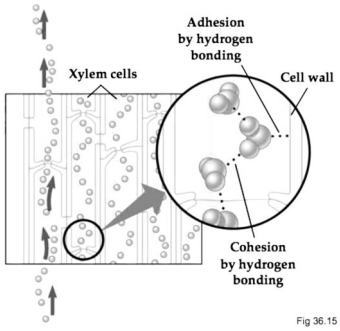
Ans. (b) : Vessels perform the function of conduction of water and minerals from the roots to the other parts of plants.

130. Cohesion and adhesion theory is otherwise called

(a) Relay pump theory
(b) Pulsation theory
(c) Root pressure theory
(d) Transpiration pull theory

J&K CET-2009

Ans. (d) : The loss of water from mesophyll cells of the leaf by transpiration creates transpiration pull or tension, which moves the water column upwards. Thus, the cohesive, adhesive forces and transpiration pull lift up the water through xylem element.



131. Percentage of water left in the soil when a plant wilts is known as:

(a) Turgidity coefficient
(b) Wilting coefficient
(c) Field capacity
(d) Water retaining capacity of the soil

JIPMER-1997

Ans. (b) : The percentage of water left in soil when plants begin to wilt is called as wilting coefficient. At wilting coefficient soil contains hygroscopic and chemically bound water. The permanent wilting point is the water content of the soil at –1.5 Mpa water potential.

132. The rupture or fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of

(a) Lignified thick walls
(b) Cohesion and adhesion
(c) Weak gravitational pull
(d) Transpiration pull

JIPMER-2012
BHU PMT (Screening)-2010

Ans. (b) : The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of cohesion and tension. The water molecules have a great mutual attraction with each other or in other words we can say that they have tremendous cohesive power which is sometimes as much as 350 atmospheres. Thus, the transpiration pull develops a negative pressure in the uppermost xylem cells. It is transmitted from there into the xylem of stems, and from there to the roots.

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133. Symplast
(a) Is living component of cell
(b) Consist of cytoplasm and cell membrane
(c) Both (a) and (b)
(d) None the above

VMMC-2008 / AMU-2008

Ans. (c) : Symplast is a living system formed by cytoplasm of cells through plasmodesmata. It consists of cytoplasm and cell membranes of adjacent cells during the symplastic movement water travels through the plasmodesmata.

134. Which one of the following forms of soil water can be readily absorbed by the roots?
(a) Capillary water (b) Hygroscopic water
(c) Run away water (d) Gravitational water

UP CPMT-2006
AP EAMCET-2005

Ans. (a): Capillary water is the form of water present in the space, formed among the soil particles. This is only form of water available to the plant for absorption.
Hygroscopic water – Water, which is absorbed by the particles of the dry soil from the atmosphere. Total water content of the soil when all process is filled with water.
Run away water – Water, when drained away from the soil surface along with slope, is known as runaway water.
Gravitational water – The water which percolates deep in the soil, due to gravity is called gravitational water.

135. Most accepted theory for ascent of sap is
(a) Capillarity theory (b) Root pressure theory
(c) Pulsation theory (d) Transpiration pull

JIPMER-2009

Ans. (d) : Transpiration pull cohesion theory of Dixon and Jolly is the most widely accepted theory for the ascent of sap in trees. This theory is based on three assumptions.
(1) Cohesion between water molecules.
(2) Continuity of water column and the transpiration pull.
(3) Transpiration pull is the principal method of water flow in plants, employing capillary action and the natural surface tension of water.

136. Loss of water from the tip of leaves is known as:
(a) Transpiration (b) Bleeding
(c) Exudation (d) Guttation

UP CPMT-2005

Ans. (d): Guttation is the process of loss of water droplets from pores and tip of leaves known as hydathodes.
- **Transpiration** is a process that involves loss of water vapours through the stomata.
- **Bleeding** occurs due to the pressure of sap within the tissues that conduct water and sugars around the plant.
- **Exudation** is the liquid that is secreted or leaked from the blood vessels in the adjoining tissues as a result of injury or inflammation. Exudate play an important role in the healing of the wound.

137. Passive absorption of water by the root system is the result of
(a) Forces created in the cells of the root
(b) Increased respiratory activity in root cells
(c) Tension on the cell sap due to transpiration
(d) Osmotic force in the shoot system

Karnataka CET-2006

Ans. (c) : Passive absorption of water by the root system is the result of tension on the cell sap due to transpiration. Transpiration is a process that involves loss of water vapour through stomata of plants. Transpiration performed through stomata.

138. Water is lost in a liquid state in some plants through hydathodes. These hydathodes
(a) Remain closed at night
(b) Remain closed during day
(c) Remain always open
(d) Do not show any specificity in opening and closing

Karnataka CET-2006

Ans. (c) : Loss of water in form of liquid dropletes is called guttation. Hydathode is a plant organ responsible for guttation in vascular plants. It always open in plants. Hydathodes are located along the margin and on surface of leaves. Guttation is common in humid tropic.

139. The magnitude of root pressure ranges from:
(a) 2-5 atm (b) 1-5 atm
(c) 0.1-0.2 atm (d) 4-6 atm

JIPMER-2004

Ans. (b) : The original term pressure was used by Stephen Hales (1727).The magnitude of the original pressure is 1-2 atm and very rarely 5 atm. Root pressure a manifestation of active water absorption is a positive pressure which is developed in the xylem sap of root of the same plant.

140. A cell 'A' with D.P.D. = 8 is surrounded by three cells 'B', 'C' and 'D' with D.P.D. respectively 4, 6 and 5. What shall be the direction of water movement
(a) B → A ← C
↑
D
(b) A → B → C → D
(c) D → C → B ← A
(d) A → B ← C → D

AIPMT-1998

Ans. (a) : A cell 'A' with D.P.D. = 8 is surrounded by three cells 'B', 'C' and 'D' with D.P.D. respectively 4, 6 and 5, the direction of water will be water moves from a cell with lower DPD to a cell with higher DPD.

B → A ← C
↑
D

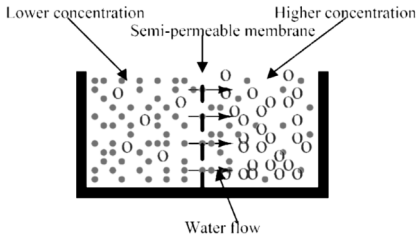
- Since we are provided with the arrangement of the cell and with the DPDs of all cells
- We find that in arrangement of A cell at centre and B, C and D cell surrounding it.
- Water movement in A from all the cells.

141. When water moves through a semipermeable membrane then which of the following pressure develops : -
(a) O.P. (b) S.P.
(c) T.P. (d) W.P.

AIPMT-2001

@apna_pdf

Ans. (a) : Osmotic pressure is the pressure in atmospheric pressure, which is required in opposite direction, so as stop entry (solvent) molecules, when a semipermeable membrane separates concentrated solution from weaker solution.



142. Path of water movement soil to xylem is

(a) Soil → Root hair → Cortex → Pericycle → Endodermis → Metaxylem → Protoxylem
(b) Soil → Root hair → Cortex → Endodermis → Pericycle → Protoxylem → Metaxylem
(c) Soil → Root hair → Epidermis → Endodermis → Phloem → Xylem
(d) Soil → Root hair → Epidermis → Cortex → Phloem → Xylem
(e) Soil → Root hair → Cortex → Protoxylem → Phloem → Metaxylem

Kerala PMT-2008

Ans. (b) : Plant absorb water that is present in the soil through root hairs. The root hairs are extensions of the epidermis of the root that helps increasing the surface area to volume ratio thereby increasing the absorption of water from the soil. The water absorbed through root hairs enters into the root that moves horizontally through the cortex, endodermis and pericycle before reaching the xylem. So, the path of water movement from soil to xylem is

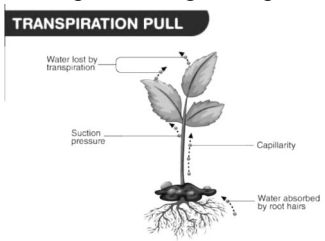
Soil→ Root hair→ Cortex → Endodermis → Pericycle → Protoxylem → Metaxylem

143. In tall plants, because of which factor, continuous water column extends upward?

(a) Atmospheric pressure (b) Osmotic pressure
(c) Suction pull (d) Root pressure

GUJCET-2011

Ans. (c) : Transpiration pull and cohesion – tension theory was proposed by Dixon and Jolly. The molecules form a continuous column by cohesion. The cell walls of xylem vessels have a strong affinity for water molecules. Loss of water from aerial parts through transpiration.



144. Which is essential for root hair growth ?

(a) Zinc (b) Calcium
(c) Molybdenum (d) Sulphur

JIPMER-2010

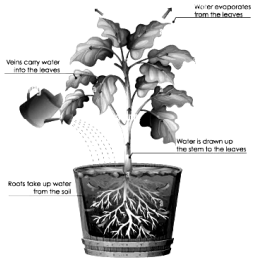
Ans. (b) : Growth of root hairs is occur due the presence of essential macromolecule calcium. Deficiency of calcium cause distorted growth in some regions because of damaged cell wall synthesis particularly in root tips, early leaves and shoot tips. Source of calcium is water and fertilizers.

145. Transpiration and root pressure cause water to rise in plants by :

(a) Pulling and pushing it, respectively
(b) Pushing it upward
(c) Pushing and pulling it, respectively
(d) Pushing it upward

AIPMT-2015

Ans. (a) : Transpiration causes water to rise in plant by pulling through xylem elements. Root pressure causes water to rise in plants by pushing water in xylem components. So the rise of water in plants is done by pulling and pushing via transpiration and root pressure respectively.



146. Root pressure develops due to:

(a) Increase in transpiration
(b) Active absorption
(c) Low osmotic potential in soil
(d) Passive absorption

AIPMT (Re-Exam)-2015
Rajasthan PMT-1999

Ans. (b) : Root pressure develops due to active absorption. During active absorption, water is absorbed from the roots due to force develop in the root system. It is triggered by the energy molecule (ATP), released during metabolic activity of root cells such as respiration.

147. The force responsible for upward conduction of water against gravity comes from .....

(a) transpiration (b) photosynthesis
(c) translocation (d) respiration

Karnataka CET-2011

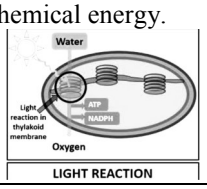
Ans. (a) : The force responsible for upward conduction of water against gravity comes from transpiration.

148. The light phase of photosynthesis is called:

(a) Hill reaction (b) photo action
(c) pigment action (d) chorophyllous process

JIPMER-2006

Ans. (a) : The hill reaction suggests that a sufficient terminal electron acceptor is necessary for the light-dependent reaction of photosenthesis to take place and this reaction is the end product of a redox process. Thus by reducing NADP to NADPH, solar energy is transformed into chemical energy.



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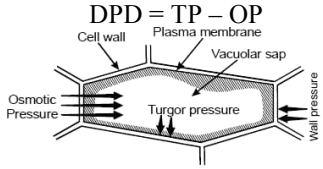
149. If turgor pressure becomes equal to the wall pressure, then
(a) Water leaves the cell
(b) Water enters the cell
(c) No exchange of water takes place
(d) Solute goes from the cell into water.

AIIMS-2002

Ans. (c) : When water enters the cell of a plant cytoplasm and exerts an outward pressure and that pressure is called turgor pressure. Due to turgor pressure, rigid cell wall offers resistance. This resistance works in a direction opposite to turgor pressure. But it is equal to turgor pressure and is called wall pressure. In this condition, no exchange of water takes place.

DPD = TP – OP



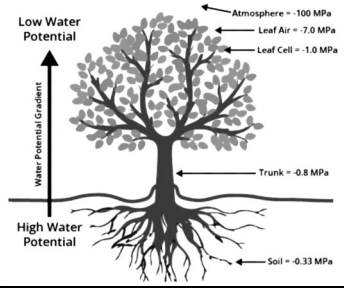
TURGOR PRESSURE

150. In plants, water moves from
(a) Less negative to more negative gradient
(b) More negative to less negative gradient
(c) Same gradients
(d) None of the above.

AIIMS-2001

Ans. (a) : In plants, water is absorbed by roots from the soil and it has to get transported to all parts of the plant. The pressure gradients needed to move water through the xylem could result from the generation of positive pressure at the base of the plant or negative pressure at the top of the plant.

• The water at the top of a free develops a large tension and this tension pulls water though the xylem. The xylem tensions needed to pull water from the soil level up in leaves as a consequence of transpiration.



151. The movement of water, from one cell of cortex to adjacent one in roots, is due to
(a) accumulation of inorganic salts in the cells
(b) accumulation of organic compounds in the cells
(c) water potential gradient
(d) chemical potential gradient

AIPMT-1995

Ans. (c) : The movement of water, from one cell of cortex to adjacent one in roots, is due to water potential gradient. Movement of water always occurs from low diffusion pressure deficit to high diffusion pressure deficit. During water absorption by roots water as well as solutes enter through root hair. After absorption of water by root hair, its turgor pressure in increased and thus diffusion pressure deficit is decreased.

152. Which of the following maintain the Shape of cell ?
(a) Osmotic pressure (b) Turgor pressure
(c) Wall pressure (d) Osmosis

Punjab MET-2006

Ans. (b) : Turgor pressure is the pressure exerted by the fluid (usually water) inside the plant cell against its cellule. It is the force that keeps the wall rigid and maintains the shape of the cell. Without turgor pressure, plant cells would collapse and lose their shape.

153. Select the correct statement :
(a) Absorption of water by seeds and dry wood are examples of facilitated diffusion
(b) The apoplast is the system of interconnected protoplasts
(c) Pinus seeds cannot germinate and establish without the presence of mycorrhizae
(d) The translocation in phloem is unidirectional whereas in the xylem it is bidirectional
(e) In plants, the water loss in its liquid phase is known as transpiration

Kerala PMT-2011

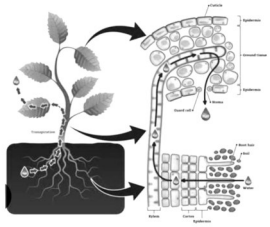
Ans. (c) : Pinus seeds cannot germinate without my corrhizal due to lack of water. As the mycorrhizal symbiotic association helps the plant in formation of root, mycorhizal fungi, which aid in the uptake of water and nutrients from the soil.

154. Which of the following is the most accepted theory for movement of water through plants?
(a) Cohesion theory (b) Capillarity
(c) Passive transport (d) Root pressure

DUMET-2011

Ans. (a) : The most accepted theory of ascent of sap is transpiration pull theory or cohesion-tension theory proposed by Dixon and Jolly (1894). According to this theory, water molecules are attracted to each other and to the walls of the xylem tubes which creates a continuous water column from the roots to the leaves. The tension created by transpiration pulls the water column upwards, against the force of gravity.

PLANT COHESION



155. If the humidity of the atmosphere suddenly increases substantially, the water flow in the xylem will
(a) increase
(b) decrease
(c) remain unaltered
(d) increase sharply and then reduce slowly to the pre-existing level

KVPY SB & SX-2014

Ans. (b) : If the humidity of the atmosphere suddenly increases substantially, the water flow in the xylem will decrease.

@apna_pdf

156. The continuation of excretion of watery liquid for sometime from the stump of a well watered pot plant after cutting off the shoot slightly above the base is due to:
(a) transpiration pull
(b) root pressure
(c) cohesive force of water
(d) absorption of minerals by roots

AP EAMCET-1998

Ans. (b) : The continuation of excretion of watery liquid for sometime from the stump of a well watered pot plant after cutting off the shoot slightly above the base is due to root pressure. Root pressure is generated by active uptake of minerals by root, which lowers water potential of root cells and water, flows inside in cells along its concentration gradient.
Thus, on the cutting of shoot, excretion of watery substance from cut side occurs.

157. Active absorption of water is affected by :
(a) osmosis in cytoplasm (b) transpiration pull
(c) osmotic tissue (d) none of the above

Rajasthan PMT-1999

Ans. (b) : Active absorption of water is affected by transpiration pull. The force which pull water from roof to the leave is known as transpiration pull or the suction force.

158. The movement of water from higher water potential to lower water potential through a semi-permeable membrane is called
(a) osmosis (b) diffusion
(c) plasmolysis (d) imbibitions

J&K CET-2010

Ans. (a) : The flow of water from a region of higher water potential to a region of lower potential, when the two solutions are separated by a semi or differentially permeable membrane is known as osmosis.
Plasmolysis- plasmolysis is the process in which cells loose water in a hypertonic solution.

159. Passage cells help in
(a) transport of water towards pericycle
(b) transport of water towards epiblema
(c) abosrption of water from soil
(d) passage of Co_2 towards stomata

WB JEE-2015

Ans. (a) : Passage cells help in the passage of water towards the pericycle. Passage cells are specialized cells that occur in the endodermis, which is a single layer of cells the surrounds the vascular cylinder. These cells have thin and porous cell walls. Which allow water and dissolved minerals to move through them easily.

160. Wilting of plant is because:
(a) xylem is blocked
(b) phloem is blocked
(c) epidermis and few roots are removed
(d) pith is removed

WB JEE-2008
Rajasthan PMT-2005

Ans. (a) : Wilting of plant is because xylem is blocked. Xylem is responsible for transport of water. If xylem is blocked, the plant will undergo wilting due to lack of proper transport of water.

E. Osmosis and Plasmolysis

161. Osmotic pressure of a solution is
(a) Greater than pure solvent
(b) Less than pure solvent
(c) Equal to pure solvent
(d) Less than or greater than pure solvent

JIPMER-2010
BHU PMT (Screening)-2007
BVP-2004
DUMET-2003

Ans. (a) : Osmotic pressure of a solution is always higher than that of pure water. However, osmotic potential is always negative of less than of pure water.

162. Root hair absorbs water from soil through
(a) Turgor pressure (b) Ion exchange
(c) Osmosis (d) DPD

MHT CET-2019
JIPMER-2008
BHU PMT (Screening)-2007
VMMC-2007

Ans. (c) : The root hairs take water from the soil through osmosis. In osmosis, water molecules move from a region of higher concentration to a region of lower concentration through a semi-permeable membrane. The concentration of the water molecules is lower in the root hair than in the soil.

163. Four cells A, B, C and D are placed in different water potentials solutions given below. Choose the pair of cells which exhibit same type of osmic flow

Cell	Solution
A : $\psi = -0.05$	$\psi = -0.2$
B : $\psi = -0.2$	$\psi = -0.001$
C : $\psi = -0.001$	$\psi = -0.3$
D : $\psi = -0.6$	$\psi = -0.05$

(a) A and C: Exosmosis
(b) B and C : Endosmosis
(c) B and D : Exosmosis
(d) A and D : Endosmosis

TS EAMCET-10.05.2023, Shift-II

Ans. (a) : Osmotic flow is the movement of water across a semi-permeable membrane from an area of high water potential to an area of low water potential.

164. Which of the following statements truly justifies osmosis of water through a selectively permeable membrane?
(a) Movement of solvent from a region of higher solvent concentration to a region of lower solvent concentration
(b) Movement of solvent from a region of lower free energy or chemical potential
(c) Movement of solvent from a region of higher solute concentration to a region of lower solute concentration
(d) Movement of solvent from a region of lower water potential to a region of higher water potential

TS EAMCET-11.05.2023, Shift-II

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Ans. (a) : Movement of solvent from a region of higher solvent concentration to a region of lower solvent concentration.

- The term osmosis was first given by "Wilhelm Pfeffer in 1977".
- In the body, the homeostasis is maintain by osmosis.

165. Which one of the following processes would be an immediate effect on a plant if there is a sudden and large increase in soil salinity?

(a) Plasmolysis of root cells
(b) Closure of stomata
(c) Increase in transpiration
(d) Increase in root turgidity

KVPY (SA)-2021

Ans. (a) : Plasmolysis of root cells would be an immediate effect on a plant if there is a sudden and large increase in soil salinity when there is an increase in soil salinity, When there is an increase in soil salinity the concentration of salt in the soil solution becomes higher than the concentration of salt in the plant cells. As a result, water moves out of the plant cells, causing them to shrink and lose turgor pressure. This process is known as plasmolysis and it can lead to a decrease in plant growth and lead to a decrease in plant growth and even death if the salinity levels are high enough.

166. Choose the correct statements.

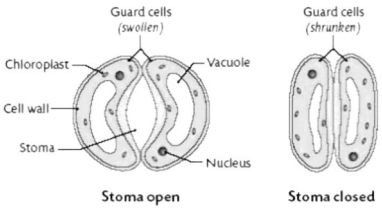
(A) Concentration gradient must already present for molecules to diffuse even if facilitated by proteins.
(B) A seed may appear dry as it has no water.
(C) The absorbance of water by corn plant is 5 liters in a day
(D) Numerically osmatic pressure is equal to osmatic potential with change in sign.
(E) Transpiration is affected by root/shoot ratio

(a) A, B, C only (b) A, D, E only
(c) B, C, E only (d) C, D, E only

TS EAMCET-29.09.2020 Shift-I

Ans. (b) : The correct option is ,

- Concentration gradient must already present for molecules to diffuse even if facilitated by proteins.
- Numerically osmatic pressure is equal to osmatic potential with change in sign.
- Transpiration is affected by root/shoot ratio.



167. The salting of pickles is an example for

(a) Deplasmolysis (b) Plasmolysis
(c) Flaccidity (d) Turgidity

AP EAMCET-24.09.2020 Shift-I

Ans. (b) : The salting of pickles is an example of plasmolysis.
Plasmolysis is the characteristic feature of living walled cells. All living cells (which has cell wall) plasmolyse when kept in a hypertonic solution.

168. During phase of cell enlargement in plant growth, solute concentration favours_____.

(a) endosmosis (b) plasmolysis
(c) imbibition (d) exosmosis

MHT CET-01.10.2020 Shift-I

Ans. (a) : During the phase of cell enlargement in plants growth, the solute concentration inside the cell is higher than outside the cell. This creates a hypertonic environment outside the cell and a hypertonic environment inside the cell which favors the process of endosmosis.

169. Pickles are preserved for longer period by the addition of salt. Which process is involved here?

(a) Osmosis (b) Guttation
(c) Plasmolysis (d) Imbibition

TS EAMCET-29.09.2020 Shift-II
Karnataka CET-2000

Ans. (c) : Pickles are preserved for longer period by the addition of salt. The process is involved here Plasmolysis. When salt is added to the pickling solution, it creates a hypertonic environment, causing the water to be drawn out of the cells of the food being pickled. This makes it difficult for bacteria and other microorganisms to grow thus preserving the food for a longer period.

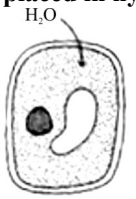
170. What will be the direction of flow of water when a plant cell is placed in a hypotonic solution ?

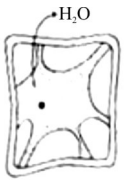
(a) No flow of water in any direction
(b) Water will flow in both directions
(c) Water will flow out of the cell
(d) Water will flow into the cell

NEET (Odisha)-2019

Ans. (d) : When a plant cell is placed in hypotonic solution water will flow into the cell as water moves from high water potential to low water potential. The behaviour of plant cells with regards to water movement depends on the surrounding solution. Thus, when a plant cell is placed in hypotonic solution, the water will flow into the cell and the cell will swell. Water will enter into the cell due to endosmosis and turgor pressure of cell will increase. As wall pressure is equal and opposite to the turgor pressure. The wall pressure will increase.

171. Cell placed in hypertonic solution is shown by

(a) 

(b) 

(c)

(d) Both (a) and (b)

JIPMER-2019

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Ans. (b) : Cell placed in hypertonic solution is shown by diagram (b). Hypertonic solution of the cell, if the concentration of solutes is higher compared to inside the cells. The cell will shrink because water moves out, firstly from the cytoplasm and then from the vacuole. This process is called as exosmosis which leads to the plasmolysis.

172. Which of the following are required for chemiosmosis?
I. A membrane
II. A neutron pump
III. An electron gradient
IV. ATPase
The correct answer is:
(a) I & II (b) II & III
(c) I & III (d) I & IV

TS EAMCET-08.05.2019 Shift-II

Ans. (d) : Chemiosmosis needs a membrane proton pump a proton gradient for making ATP with the help of ATPase enzyme.
ATP synthesis is connected with the development of proton gradient across membrane in both photosynthesis and respiration. Chemoiosomis is the ion movement across a semi permeable membrane against proton gradients.

173. Find the correct answer
(a) Water movement is against concentration gradient in Imbibition
(b) Addition of solute particles to a solution enhances water potential
(c) Rate of osmosis depends on both the pressure gradient and concentration gradient
(d) Pressure potential is negative in sieve tubes

AP EAMCET-25.04.2018 Shift-II

Ans. (c) : The rate of osmosis always depends on both pressure and concentration gradient. Osmosis occurs spontaneously in response to a driving force. The net direction and rate of osmosis depends on both the pressure gradient and concentration gradient.

174. When a freshwater protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will
(a) increase in number (b) disappear
(c) increase in size (d) decrease in size

Manipal-2007

Ans. (b) : When a freshwater protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will disappear. Contractile vacuoles serves function of osmoregulation. When these protozoan are placed in marine water i.e. hypertonic water, the cell stant to lose water through the process of exosmosis.

175. RBC and a plant cell (with thick cell wall) are placed in distilled water. The solute concentration is the same in both the cells. What changes would be observed in them?
(a) Both plant cell and RBC would not undergo any change.
(b) The RBC would increase in size and burst while the plant cell would remian about the same size.
(c) The plant cell would increase in size and burst while the RBC would remain about the same size.
(d) Both plant cell and RBC would decrease in size and collapse.

Manipal-2009

Ans. (b) : When RBC and a plant cell (with thick cell wall) are placed in distilled water, endosmosis (movement of water molecules from higher concentration (distilled water) to lower concentration) takes place and the result of which RBC would increase in size and burst, while the plant cell would remain about the same size because of the presence of a rigid cell wall.

176. The values of osmotic potential (Pi) and pressure potential (p) of cells A, B, C and D are given below.

	π
Cell A	**– 1.0**
Cell B	**– 0.6**
Cell C	**– 1.2**
Cell D	**– 0.8**

Identify the correct sequence that shows the path of movement of water from among the following
(a) $D \rightarrow C \rightarrow A \rightarrow B$ (b) $B \rightarrow D \rightarrow A \rightarrow C$
(c) $B \rightarrow C \rightarrow D \rightarrow A$ (d) $C \rightarrow B \rightarrow A \rightarrow D$

VMMC-2010

Ans. (b) : The flow of water occurs from a high potential to a lower potential.

Cell	Water potential (Osmotic potential + Pressure potential)
A	–1 + 0.5 = – 0.5
B	– 0.6 + 0.3 = – 0.3
C	– 1.2 + 0.6 = – 0.6
D	– 0.8 + 0.4 = – 0.4

177. The risk of spoilage is less in salted pickles because of:
(a) guttation (b) plasmolysis
(c) imbition (d) diffusion

AP EAMCET-2002
Uttarakhand PMT-2010

Ans. (b) : The risk of spoilage is less in salted pickles because of plasmolysis. Plasmolysis is the process of shrinkage of protoplasm away from the cell wall. The fluid content of the cell is removed due to the process of exosmosis. Due to the salt, the concentration outside is hypertonic and the water from the pickle is removed out. The dry pickle is less prone to spoilage and can be stored for longer.

178. Excess salt inhibits growth in pickles by
(a) endosmosis (b) exosmosis
(c) oxidation (d) denaturation

KVPY SA-2015

Ans. (b) : The excessive salt is used for the presser vation of the pickles for long period of time. The high concentration of salt in the pickles causes the removal of the water from the bacterial cells resulting plasmalysis.
Due to hypertonic solution outside the bacterial cell, bacteria will die by plasmolysis.

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179. Osmosis involves

(a) flow of water without a membrane
(b) flow of solute from a semipermeable membrane
(c) flow of solvent (H_2O) through semi-permeable membrane
(d) None of the above

BHU-PMT (Screening)-2008

Ans. (c) : Osmosis is the term used to refer specifically to the diffusion of water across a differentially or semi permeable membrane. Osmosis occurs spontaneously in response to a driving force. The net direction and rate of osmosis depends on both the pressure gradient and concentration gradient. Water will move from its region of higher chemical potential or concentration to its region of lower chemical potential untill equilibrium is reached. At equilibrium the two chambers should have the same water potential. .

180. If flowers are cut and dipped in dilute NaCl solution then

(a) Transpiration is law
(b) Endosmosis
(c) No bacterial growth takes place
(d) Absorption of solute inside flower cell takes place

BCECE-2008

Ans. (b) : Dilute NaCl solution acts are hypotonic solution Endosmosis occurs is flower cells. Endosmosis it's the process of osmotic entry of solvent or water into a cell or system when it is in contact with hypotonic solution or pure solvent. Endosmosis makes the flowers cells turgid.

181. A cell swells up when kept in

(a) Hypotonic solution (b) Hypertonic solution
(c) Isotonic solution (d) All of the above

BCECE-2008
UP CPMT-2007

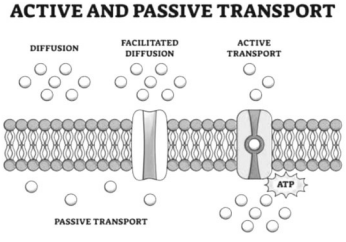
Ans. (a) : A cell swells up when kept in a hypotonic solution due to the process of endosmosis.
Endosmosis is the movement of water into the cell and such a plant cell is referred to turgid.

182. Movement among cells against concentration gradient is called.

(a) osmosis (b) active transport
(c) diffusion (d) Passive transport

AFMC-2007
BCECE-2004

Ans. (b) : Active transport is the movement of the molecules or ions of a substance from a region of their lower concentration to a region of then higher concentration region against the concentration gradient by using energy.



183. Isotonic solutions have same

(a) Normality (b) pH
(c) Temperature (d) Osmolarity

BCECE-2009
J&K CET-2005

Ans. (d) : Isotonic solutions have same osmotic pressure at a given temperature and have same molar concentration i.e. same osmolarity. Osmolarity is measure of concentration per litre of water.

184. The osmotic parameter determining the flow of water from one cell to another is

(a) OP (b) DPD
(c) TP (d) Hydrostatic pressure

AMU-2003
Rajasthan PMT-2000

Ans. (b) : Diffusion pressure deficit (DPD) is the force that determines the flow of water from one cell to the another, it is the difference in diffusion pressure between osmosis pressure and turgor pressure.

185. The plants may face wilting due to use of excess fertilizers because of

(a) endosmosis (b) exosmosis
(c) imbibition (d) transpiration

AMU-2002

Ans. (b) : The plants may face wilting due to use of excess fertilizers because of exosmosis.
It is the movement of water outside the cells when a cell is placed in a hypertonic solution.

186. Living cells placed in isotonic solution (0.9% saline) retain their size and shape. This is based on the concept of

(a) Osmosis (b) Diffusion
(c) Facilitated diffusion (d) Transpiration

WB JEE-2012

Ans. (a) : When living cells are placed in isotonic solution, they retain their shape and size as such because no osmotic movement of water molecules takes place. If a plant cell is placed in hypertonic solution, the cell gets plasmolysed due to exosmosis. On the other hand, if a plasmolysed cell is placed in hypotonic solution, endosmosis occurs and the cell gets deplasmolysed.

187. When the cell is fully turgid, its

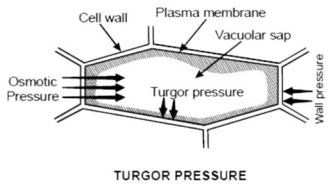
(a) DPD = OP (b) DPD = zero
(c) WP = TP (d) OP = zero

WB JEE-2010

Ans. (c) : When a cell is fully turgid, its walls and membranes are completely stretched. At this time osmotic pressure of the cell will be equal to turgor pressure.

OP = TP so DPD = 0
WP = OP – DPD
WP = OP
WP = TP

Water always flows from the lower DPD to higher DPD. The TP is equal & opposite indirection of WP.



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188. Which of the following maintain the shape of cell?
(a) Osmotic pressure (b) Turgor pressure
(c) Wall pressure (d) Osmosis

Rajasthan PMT-2004

Ans. (b) : Turgor pressure of maintain the shape of a cell. Turgor is generated through an osmotically driven in flow of water into cells across a plasma membrane.

189. Exchange of substances between individual cells and their environments taken place by:
(a) osmosis (b) active transport
(c) diffusion (d) all of these

BHU PMT-2002

Ans. (d) : Diffusion :- Diffusion is the movement of molecules (solid, liquid, gas) from a region of higher concentration to a region of lower concentration till a level of equilibrium is reached.
Osmosis :- Osmosis is the movement of a solvent across a semi permeable membrane towards a higher concentration of solute.
Active transport :- Active transport is a kind of cellular transport where substances move against a concentration gradient.

190. In osmosis there is movement of
(a) solute only
(b) solvent only
(c) both (a) and (b)
(d) neither solute nor solvent

DUMET-2005 / UP CPMT-2003

Ans. (b) : Osmosis is a movement of solvent from their high concentration to low concentration or higher water potential to lower potential or high solute potential to low solute potential through semipermeable membrane.

191. Active K^+ exchange mechanism for opening and closing of stomata was given by
(a) Darwin (b) Levitt
(c) Scarth (d) Khorana

BVP-2012 / MGIMS Wardha-2007

Ans. (b) : This mechanism of stomatal opening and. closing was first given by Levitt. It state that an increase in potassium (K) ion makes the guard cells hypertonic so that more water can enter inside the cells.

192. Which of the following characteristics are associated with hydrophytes ? (1) Water and mineral nutrients are absorbed through general body surface (2) Osmotic concentration or osmotic potential of cell is equal to or slightly higher than external water (3) Presence of weak and negatively geotropic roots (4) Presence of mucilage to hold water
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2009

Ans. (b) : Some of the major features of hydrophytes are as follows.
- Water and mineral nutrients are absorbed through general body surface.
- Osmotic concentration or osmotic potential cells is equal to or slightly higher than external water.
- Reduced root system

Therefore correct answer is option (b).

193. Solute potential of a solution is always
(a) = 0 (b) > 0
(c) < 0 (d) Between 0 - 1

DUMET-2010

Ans. (c) : Solute potential of a solution is less than zero that is always negative. Its magnitude depends on the concentration of solute particles in the solution.

194. Which of the following statements about plasmolysis is/are true?
(i) Plasmolysis occurs when water moves into the cell
(ii) Cells shrink in hypotonic solutions
(iii) If the external solution balances the osmotic pressure of the cytoplasm, it is said to be isotonic
(a) i only (b) ii only
(c) iii only (c) i and ii only
(e) ii and iii only

Kerala PMT-2015

Ans. (c) : Plasmolysis is the process of shrinking of plasma membrane from the cell wall then the cell is placed in a hypertonic solution. This happens due to exosmosis as water moves out of cell into the solution. When the cell (or tissue) is placed in an isotonic solution, these is no net flow of water towards the inside or outside. If the external solution balances the osmotic pressure of the cytoplasm it is said to be isotonic.

195. The sign of osmotic potential is :
(a) (–) (b) (+)
(c) $(\times)$ (d) $(\div)$

Rajasthan PMT-1998

Ans. (a) : Osmotic potential (Ψ_s) results from dissolved solution in cell sap and is proportional to solute concentration and inversely proportional to cell water volume. Ψ_s in plants is always negative and decreases as solutes concentrate during plant dehydration means no solute present in water hence its symbol is negative (–).

Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

196. Which one is a colligative property ?
(1) Osmotic pressure
(2) Vapour pressure
(3) Cohesion force
(4) Surface tension
(a) 1, 2 and 3 are correct. (b) 1 and 2 are correct.
(c) 2 and 4 are correct. (d) 1 and 3 are correct.

BHU PMT (Mains)-2008

Ans. (b) : The properties when depend only upon the number of solute particles present in the solution irrespective of their nature are called colligative properties. Lowering in vapour pressure, elevation in boiling point, depression in freezing point and osmotic pressure are colligative properties.

197. All the following involves osmosis except which case:
(a) water entering from soil into root hair
(b) water passing from root hair to an adjacent cell

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(c) water passing up on xylem vessel element to xylem vessel element above
(d) water entering a mesophyll cell from the xylem vessel

Haryana PMT-1999

Ans. (c) : Osmosis is defined as the movement of solvent or water along the concentration gradient across living semi permeable membrane. Osmosis involve,
- Water entering from soil into root hair.
- Water passing from root hair to an adjacent cell
- Water entering a mesophyll cell from the xylem vessel
- All of the above involves the osmosis except the water passing from one xylem vessel element to another xylem vessel element.

198. A Red Blood Cell (RBC) was kept in a certain solution for few minutes and it got burst. The said solution was
(a) isotonic (b) concentrated sugar solution
(c) hypertonic (d) hypotonic

AMU-2005

Ans. (d) : When an red blood cell (RBC) is kept in a hypotonic solution then, water enters the RBC by the process of osmosis (Endosmosis). The RBC will increase in size and ultimately burst. Osmosis is the movement of solvent particles from hypotonic to hypertonic medium through semipermeable membrane.

199. If water enters in a cell, the pressure exerted by its swollen protoplast is:
(a) turgor pressure (b) DPD
(c) osmotic pressure (d) imbibtion

AFMC-2004

Ans. (a) : The turgidity of cell increases, if water enters in a cell. As a result of turgidity turgor pressure is exerted by its swollen protoplast.

200. Assertion: Passive process like diffusion and osmosis do not require energy.
Reason: Because the plasma membrane is a static structure.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) Assertion is true but Reason is false
(d) Assertion is false but Reason is true

VMMC-2011

Ans. (c) : Diffusion process is a passive transport because it does not require energy. In osmosis process the solvent molecules move from lower solute concentration to higher solute concentration through a semi permeable membrane. This process does not require energy.

201. Flaccid cell means ….
(a) Plasmolysed cell
(b) Cell with turgidity
(c) The cell in which water flows in and out of cell are in equilibrium
(d) The cell kept in hypotonic solution

GUJCET-2014

Ans. (c) : Flaccid cell means the cell in which the water flow in and out of the cell and is in equilibrium. When a cell is place in an hypertonic solution water is transported out of the cell and the cell shrink or shrivel or plasmolysed. When the cell is placed in hypotonic solution the water flows into the cell causing the cell to swell and however the cell are placed in isotonic solution there will be continuous flow of water in and out of the cell and the cell is said to be in flaccid condition.

202. Compare the Statement A and B.
Statement A : To counteract the increase in turgor pressure in plant cells, the cell wall produces an equal and opposite pressure i.e. wall pressure.
Statement B : When plant cells undergo endosmosis, they swell but do not burst.
(a) Statement A is correct and B is wrong
(b) Both the statements A and B are correct and A is the reason for B.
(c) Both the statements A and B are correct and A is not the reason for B.
(d) Statement A is wrong and B is correct.

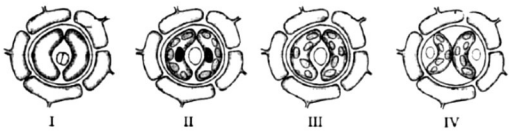
Karnataka CET-2010

Ans. (b) A hydrostatic pressure or turgor pressure develops in the confined part of an osmotic system due to osmotic entry to water into it. Due to turgor pressure the protoplast of a plant cell will press the cell wall to the outside. The cell wall being elastic presses the protoplast with an equal and opposite force. The force exerted by the cell wall over the protoplast is called wall pressure.

203. A leaf peeling of Tradescantia is kept in a medium having 10% NaCl. After a few minutes, if we observe the leaf peel under the microscope, we are likely to see
(a) Diffusion of NaCl into the cell
(b) Exit of water from the cell
(c) Entry of water into the cell
(d) The cells bursting out

Karnataka CET-2008

Ans. (b) : A leaf peeling of Tradescantia is kept in a medium having 10% NaCl. After a few minute if we observe the leaf peel under the microscope, we are likely to see exit of water from the cell. This process is known as exosmosis.



204. Response of plants due to reversible turgor change in pulvinus is
(a) Nyctinastic (b) Seismonastic
(c) Heptonastic (d) Photonastic

BCECE-2012

Ans. (b) : Seismonastic movements are due to the touch, shock, rain electric currents. The best example of seismonastic movement is the leaves of sensitive plant Mimosa pudica the movement is produced due to turgor changes in the cells of pulvinus or swollen area lying at the base of petiole pinnae and pinnules.

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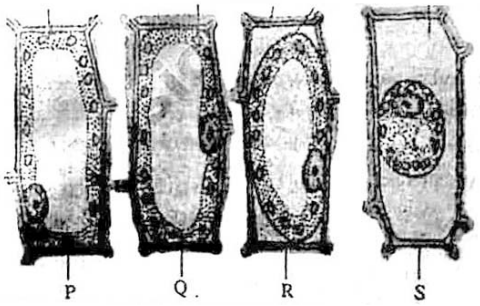
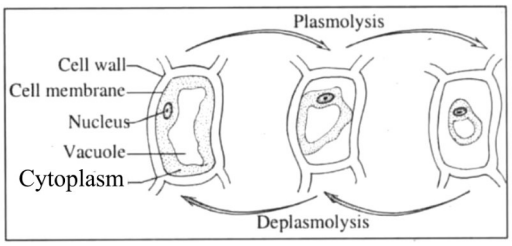
205. In the given figure, which is the initial condition of plasmolysis?



(a) P (b) Q
(c) R (d) S

GUJCET-2016

Ans. (b) : In the initial phase of plasmolysis the cell loses water and just loses its turgidity. There is little bit change in shape and cell membrane makes gap with cell wall. Image Q represents this stage. Image P represents turgid cell. Image R and S are the middle and final stages of plasmolysis.

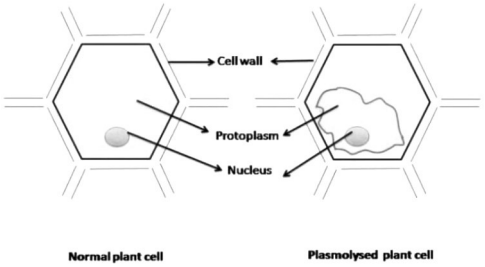


206. When plant cells are kept in a concentrated solution, they are

(a) deplasmolysed (b) plasmolysed
(c) Remains as such (d) becomes turgid

BVP-2000

Ans. (b) : When plant cells are kept in a concentrated solution, they become plasmolysed. Plasmolysis occurs when the cell loses water and the plasma membrane pulls away from the cell wall.



207. The most abundant intracellular cation is:

(a) K^+ (b) Na^+
(c) Ca^{++} (d) H^+

NEET-2013

Ans. (a) : Most abundant intracellular cation is K^+, It is involved in guard cell movements and many other plant movements. Na^+ is the most abundant extracellular cation. Both maintain osmotic balance, both involved in nerve conduction and maintenance of membrane protein in animal, living cells regularly throw out sodium and take in potassium ions.

208. Which one of the following doesn't help in molecule transport?

(a) Diffusion (b) Osmosis
(c) Surface tension (d) Active transport

JIPMER-2005

Ans. (c) : Surface tension does not help in molecules transport. Surface tension is a type of force which tends to minimize the surface area of liquid as possible. Diffusion, osmosis and active transport are the different types of molecule transport system.

209. A plasmolysed cell can be deplasmolysed by placing it in

(a) isotonic solution
(b) saturated solution
(c) pure water or hypotonic solution
(d) hypertonic solution.

AIIMS-2016 / Karnataka CET-2011 JCECE-2006

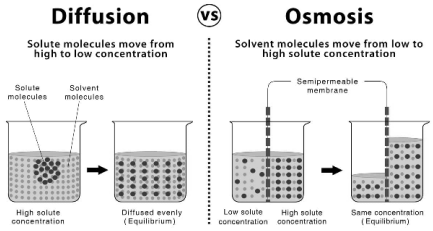
Ans. (c) : A plasmolysed cell can be deplasmolysed by placing it in pure water or hypotonic solution. Deplasmolysis is possible only immediately after plasmolysis otherwise the cell protoplast becomes permanently damaged. During deplasmolysis water diffuse into protoplast.

210. Osmosis is a type of

(a) Imbibitions of solution
(b) Diffusion of solvent
(c) Evaporation of water
(d) Diffusion of solute

AIIMS-2014

Ans. (b) Osmosis is a type of diffusion of solvent. The molecule or atom move from an area of high concentration to an area of low concentration.



211. Solution outside a cell has higher concentration than cytoplasm. Then the solution is:

(a) isotonic (b) acidic
(c) hypotonic (d) hypertonic

AFMC-2003

Ans. (d) : The solution outside a cell has a higher concentration than the cytoplasm, it means that the solution has a lower water concentration and a higher solute concentration compared to the cytoplasm. This type of solution is called hypertonic.

212. Who coined the term chemiosmosis?

(a) P. Mitchell (b) Hill
(c) Priestley (d) Calvin

Manipal-2002

Ans. (a) : The term chemiosmosis was coined by P. Mitchell in 1961. Peter Mitchell was a British biochemist who proposed the chemiosmotic theory which describes the mechanism by which ATP is synthesized in the mitochondria and chloroplasts of eukaryotic cells.

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213. The process by which water is absorbed by solids like colloids causing them to increase in volume is called :

(a) Osmosis (b) Plasmolysis
(c) Imbibition (d) Diffusion
(e) Facilitated diffusion

Kerala PMT-2011

Ans. (c) : The process by which water is absorbed by solids like colloids causing them to increase in volume is called imbibition. Imbibition is an essential process in the germination of seeds, and it also plays a crucial role in the absorption of water by plant roots.

214. When a cell is fully turgid which of the following will be zero:

(a) W.P. (b) O.P.
(c) T.P. (d) DPD

JIPMER-1996

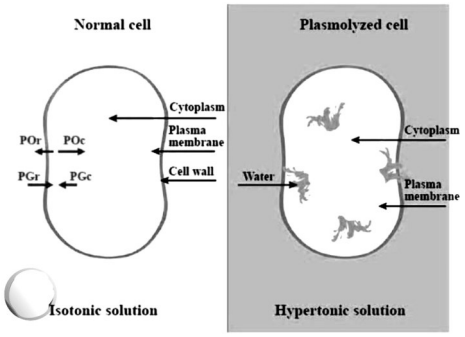
Ans. (d) : When a cell is fully turgid, the pressure potential or hydrostatic pressure inside the cell is at its maximum, and this pressure is equal and opposite to the external pressure, so the net pressure difference (DPD) is zero. Therefore, DPD is also zero when a cell is fully turgid.

215. Plasmolysis is the result of

(a) exosmosis (b) endosmosis
(c) reverse osmosis (d) diffusion

JCECE-2012

Ans. (a) : Plasmolysis is the result of exosmosis. Exosmosis is a type of osmosis where water diffuses out of a cell into a hypertonic solution, i.e.a solution with a higher concentration of solutes than the cell.



216. A plant cell becomes turgid due to

(a) plasmolysis (b) exosmosis
(c) endosmosis (d) electrolysis

WB JEE-2011

Ans. (c) : A turgid plant cell is defined as a cell which has a turgor pressure or force that is exerted by the fluid in a cell which pushes the cell membrane against the cell wall. When a plant cell is kept in hypotonic solution, i.e. solution with lesser solute concentration than cell than endosmosis will occur. Endosmosis is a process in which the water molecules move from surrounding solution to the cell through cell membrane. Due to this, the plant cell becomes turgid.

217. A plant cell is placed in a solution whose solute concentration is twice as great as the concentration of the cell cytoplasm. The plasma membrance is selectively permeable, allowing water but not solutes to pass through. What will happen to the cell ?

(a) The cell will swell because of endosmosis
(b) The cell will shrivel because of exosmosis
(c) The cell will shrivel because of active transport of water
(d) No change will occur because of hard impervious cell wall present

MGIMS Wardha-2015

Ans. (b) : A plant cell is placed in a solution whose solute concentration is twice as great as the concentration of the cell cytoplasm. The plasma membrance is selectively permeable, allowing water but not solutes to pass through. The cell will shrivel because of exosmosis.

218. Which statement is correct?

(a) Osmotic pressure of solution is greater than pure solvent
(b) Osmotic pressure of solution is lower than the pure water
(c) Osmotic pressure of solution is equal to the pure water
(d) None of the above

DUMET-2004

Ans. (a) : As more and more solute is dissolved in the solvent, the concentration of the solution goes on increasing. With the increase in concentration of the solution, the osmotic pressure of the solution, the osmotic pressure of the solution increases. Thus the osmotic pressure of solution is greater than the pure solvent. Osmotic pressure is the pressure created by water moving across a membrane due to osmosis.

219. Direction: In the given questions a statement of Assertion (A) is given and a corresponding statement of Reason (R) is given just below it of the statement, mark the correct answer as: Assertion : Plasmolysis occurs when plant cells are placed in concentrated salt solution. Reason: Concentrated salt solution is a hypotonic solution.

(a) If both (A) and (R) true and (R) is the correct explanation of (A)
(b) If both (A) and (R) are true but (R) is not correct explanation of (A)
(c) If (A) is true but (R) is false
(d) If both (A) and (R) are false
(e) If (A) is false but (R) is true

Haryana PMT-2001

Ans. (c) : Plasmolysis occurs when plant cells are placed in a hypertonic solution. Not hypotonic solution In a hypertonic solution, the concentration of solutes outside the cell is higher than inside the cell protoplasm and causing water move out through diffusion into the extracellular (outside cell) fluid causes the protoplasm to strink away from the walls. So the correct answer: (A) is true but (R) is false. The concentrated salt solution is a hypertonic, not phypotonic, and it causes plasmolysis by drawing water out of the plant cells.

220. Which of the following has maximum water potential?

(a) Pure water
(b) 2% sucrose solution
(c) 4% glucose solution
(d) 10% sodium chloride solution

J&K CET-2003

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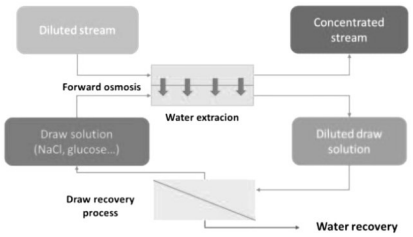
Ans. (a) : Pure water has the maximum water potential, which is defined as the potential energy of water molecules in a solution compared to pure water, which has a water potential zero. It is denoted by symbol Ψ (psi) and measured in units of pressure such as pascals. Water molecules possess kinetic energy. The greater the concentration of water in a system, of pure water.



221. The process by which water enters into plant cell is called :
(a) diffusion (b) osmosis
(c) endosmosis (d) both (b) and (c)

Rajasthan PMT-2001

Ans. (c) : The process in which water molecules enter the cell is called endosmosis. It happens due to presence of hypotonic solution on the outside. Endosmosis is a type of osmosis where water moves from a region of high water concentration to a region of low water concentration across a selectively permeable membrane, such as the cell membrane of a plant cell. Water move by osmosis which is a type of diffusion.

222. If a cell shrinks when placed in a solution, this solution is:
(a) hypotonic (b) hypertonic
(c) isotonic (d) mesotonic

JCECE-2003

Ans. (b) : In a hypertonic solution, the concentration of solutes outside the cell is higher than inside the cell protoplasm. As a result, water moves out of the cell by osmosis, causing the cell to shrink or undergo plasmolysis.

223. Water can be absorbed from a hypertonic external solution by :
(a) adding more water in the external solution
(b) auxin treated cells
(c) adding a buffer in the external solution
(d) cytokinin treated cells

BVP-2006

Ans. (b) : The auxin treated cells show an increase in their metabolism. Respiration in these cells increases and more energy is provided for the absorption of water, Auxin is a plant hormone that can stimulate the activity of proton pumps on the cell membrane, which in turn, acidifies the cell wall. This acidification leads to the activation of aquaporin channels, which facilitate the movement of water molecules into the cell. As a result, auxin-treated cells are better able to absorb water from hypertonic solution, helper them to maintaing turgor pressure and avoid damage.

224. Which of the following is true regarding guttation? (1) Occurs through stomata (2) Occurs through hydathodes (3) Loss of pure water (4) Occurs mostly during night and early morning
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2007

Ans. (c) : Guttation occurs through small openings on the leaf margin called hydathodes. The correct answer is occurs through hydathocles and occurs mostly during the night and early morning. The cause of guttation is mainly root pressure.

225. Ascent of sap in plants was demonstrated by
(a) Girdling experiment
(b) Ganongs experiment
(c) Went experiment
(d) Lever auxanometer

BCECE-2012

Ans. (a) : Ascent of sap in plant was demonstrated by girdling experiment. The Girding/Ringing experiment involves the removal of all the tissue outside to vascular cambium (bark, cortex, and phloem) in woody stems except xylem.

F. Transport of Mineral Nutrients

226. Assertion (A) : Tonoplast facilitates the transport of ions against concentration gradient. Reason (R) : Concentration of ions is significantly higher in the vacuole than cytoplasm
(a) (A) and (R) are true. (R) is the correct explanation for (A)
(b) (A) and (R) are true, but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-10.05.2023, Shift-II

Ans. (a) : Tohoplast is the membrane sorounding of vacoule. Vacoule help in maintaining cell volume and cell turgor. The regulation of cytoplamic ions and pH.
• Tonoplast help in the transport of ions and minerals against the concentration gradient into the vacoule utilizing energy in the form of ATP.

227. Match the following

List – I		List - II		List - III	
A.	Photo autotrophs	i.	Oxidation of inorganic substances	P.	Bacillus
B.	Photo heterotrophs	ii.	Organic detritus	Q.	Beggiota
C.	Chemo autotrophs	iii.	Organic CO_2	R.	Chromatium
D.	Saprophytes	iv.	Atmospheric CO_2	S.	Rhodospirillum

(a) A – iv – R, B – iii – S, C – i – Q, D – ii – P
(b) A – iv – R, B – i – Q, C = iii – S, D – ii - P
(c) A – iv – P, B – i – S, C – ii – Q, D – iii - R
(d) A – iv – S, B – iii – P, C – ii – R, D – i - Q

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : • **Photoautotrophs–** An organism that can synthesize organic compounds from inorganic substance using light as a source of energy- It include chromatium, algae, plants etc.
• **Chemoautotrophs–** They formed organic compounds from inorganic substances using chemical energy. They include some bacteria, Beggiota etc.

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• **Photoheterotrophs–** They formed organic compounds from organic compounds using light as a source of energy. It include Rhodospirillum.

• **Saprophytes–** An organism that break down dead organic matter and absorb the released nutrients. It include-fungi and bacillus.

228. Substances that undergo upward or downward transport

(a) Organic and mineral nutrients
(b) Water and minerals
(c) Minerals and plant growth regulators
(d) Hormones and amino acids

AP EAPCET-23.05.2023, Shift-I

Ans. (d) :

229. Given below are two statements :

Statement I: The process of translocation through phloem is unidirectional but through xylem, it is bidirectional.

Statement II: The most readily mobilized elements are phosphorus, sulphur, nitrogen and potassium.

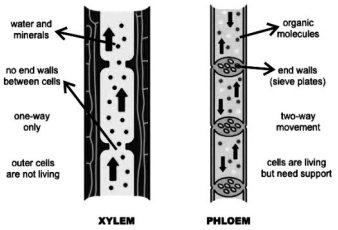
In the light of the above statements, choose the most appropriate answer from the options given below :

(a) Both Statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : Phloem translocation is bidirectional i.e. both in upward and downward directional (source to sink). This process requires ATP.

• Phosphorus, S, N, K most readily mobilize.



230. Select the incorrect statement.

(a) Elements most easily mobilized in plants from one region to another are : phosphorus, sulphur, nitrogen and potassium
(b) Transport of molecules in phloem can be bidirectional
(c) Movement of minerals in xylem is unidirectional
(d) Unloading of sucrose at sink does not involve the utilization of ATP

NEET-2020 Phase-II

Ans. (d) : Unloading of sucrose at sink is an energy dependent process.

- It is done actively with the utilization of ATP
- Sucrose is moved out of the phloem sap and transfer into the other plant cell that will use the sugar. Sugars moved out to the sink leads to the low osmotic pressure. Transfer of sugar from phloem sap to other plants cell (root, stem) is called unloading of phloem.

231. Assertion (A): Ions and organic material concentration is higher in cytoplasm than vacuole.
Reason (R): Tonoplast facilitates the transport of ions and other materials against concentration gradient into the vacuole.
Options:

(a) (A) and (R) are correct. (R) is the correct explanation to (A).
(b) (A) and (R) are correct. (R) is not the correct explanation to (A).
(c) (A) is true, (R) is false.
(d) (A) is false, (R) is true.

AP EAMCET-24.04.2019 Shift-II

Ans. (d) : Vacuoles are non-cytoplasmic areas present inside the cytoplast of plant cells. The sap vacuoles are fluid- filled vacuoles which are separated by tonoplast, (a special type of membrane) from the cytoplasms. They contain various inorganic salts and ions. Soluble pigments like anthocyanins, different types of organic acids are also found inside the sap vacuoles. These salts and ions can be transported through the tonoplast.

232. Select the incorrect statements from the following

(I) In plasmamembrane hydrophilic polar heads of lipids arrange towards the outside and the hydrophobic tail towards the innerside
(II) In plasmamembrane peripheral proteins lie on the surface of membrane while the integrated proteins are buried in the membrane
(III) Neutral solutes may move across the membrane by the process of simple diffusion against the concentration gradient
(IV) Polar molecules can pass through the non-polar lipid bilayer and do not require a carrier proteins

The correct answer is
Options:

(a) I, II (b) III, IV
(c) II, III (d) III, I

AP EAMCET-24.04.2019 Shift-I

Ans. (b) : Statement III is incorrect because the neutral solutes may move across the membrane by the process of simple diffusion along the concentration gradient, i.e. from higher concentration to the lower.
Statement IV is incorrect because polar molecules can not pass through the non-polar lipid bilayer and require a carrier protein or channel protein to move across the membrane.

233. Munch hypothesis is based on

(a) Translocation of food due to Turgor Pressure (TP) gradient and imbibition force
(b) Translocation of food due to Turgor Pressure (TP) gradient
(c) Translocation of food due to imbition force
(d) None of the above

JIPMER-2017

Ans. (b) : Munch hypothesis is based on Translocation of food due to Turgor Pressure (TP) gradient.
The mass flow of organic solutes takes places from the site of higher concentration (source) to the site of lower concentration (sink). Munch hypothesis also know as pressure flow hypothesis or mass flow hypothesis.

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234. The first acceptor of electrons from an excited chlorophyll molecule of photosystem-II is
(a) cytochrome (b) iron-sulphur protein
(c) ferredoxin (d) plastoquinone
JCECE-2015

Ans. (d) : Plastoquinone is the first acceptor of electrons from an excited chlorophyll molecule of photosystem-II. But ferredoxin is the iron-containing sulphur protein which is first pigment that accept electrons in PS-I
Light reaction of the photosynthesis start from the excitation of chlorophyll by a photon.

235. Which one of the following theories for ascent of sap was proposed by an eminent Indian scientist JC Bose?
(a) Relay pump theory
(b) Pulsation theory
(c) Root pressure theory
(d) Transpiration pull theory
VMMC-2013

Ans. (b) : The theory says that the innermost cortical cells of the root absorb water from the outer side and pump the same into xylem channels. The theory of ascent of sap was put forward by J.C Bose in 1923 which is called the vital force theory of pulsation theory.

236. Glycolate induces opening of stomata in
(a) presence of oxygen
(b) low CO_2 concentration
(c) high CO_2 concentration
(d) absence of CO_2
Manipal-2012

Ans. (b) : Glycolate includes the opening of stomata in low carbon dioxide concentration. Light causes photosynthesis which leads to reduction in concentration CO_2.

237. The cohesive force existing between molecules of water is contribution to:
(a) plasmolysis (b) translocation
(c) ascent of sap (d) osmosis
Karnataka CET-2002

Ans. (c) : This cohesive force in water molecules is essential for the ascent of the sap because of higher transpiration rate.
The force allows the water separation between them and it arises because of the hydrogen bond between the water molecules. Cohesion force holds similar molecules together. In water it is strong because the presence of hydrogen bond.

238. Minerals are absorbed by plants in
(a) Colloidal form (b) Ionic form
(c) Preciplated form (d) None of these
UP CPMT-2011

Ans. (b): The inorganic essential element which are obtained from soil are called **mineral element**. Plant absorbs the minerals in form of ion. The movement of ion is called flux and absorbed by passive absorption.

239. The movement of ions against the concentration gradient will be:
(a) Active transport (b) Osmosis
(c) Diffusion (d) All
AIPMT-2000

Ans. (a) : The movement of molecules across a cell membrane in the direction against their concentration gradient using energy is called active transport.
- Diffusion is the movement of a substance from an area of high concentration to an area of low concentration.
- Osmosis is the movement of a solvent or water across a semi permeable membrane towards a higher concentration of solute.

240. Passive absorption of minerals depend on
(a) Temperature
(b) Temperature and metabolic inhibitor
(c) Metabolic inhibitor
(d) Humidity
AIPMT-2001

Ans. (a) : Passive absorption of minerals depend on temperature.
- These carriers are required for active transport of salts from outer space in inner space.
- Rate of diffusion of ions and molecules increases at enhanced temperature due to their increased kinetic activity. Thus passive salt absorption will increase.

241. Who said that "transpiration is a necessary evil"?
(a) Curtis (b) Steward
(c) Andersen (d) J.C. Bose
JIPMER-2006

Ans. (a) : Curtis called transpiration a necessary evil because.
- It cause about 90% of water loss for the plant.
- But it is necessary for plant sucking the mineral and nutrition with water pull
- If transpiration is high than cause the wilting of leave.
- But transpiration lead cooling the plant.

242. Which of the following exhibits a direct porportionality to transpiration?
(a) Light and RH
(b) Temperature and RH
(c) Temperature and wind
(d) RH and wind
JIPMER-2006

Ans. (c) : Temperature and wind have the direct porportionality to transpiration.

243. The percentage of cell surface that is impenetrable for ions is
(a) 1% (b) 99.9%
(c) 90% (d) 73%
AIIMS-2011

Ans. (b) : Less than 0.1% of plasma membrane is perforated, which allow the ions to pass through. The transport of most ions occurs more slowly than the non-electrolytes. But H^+, OH^- penetrate all cell membrane easily. The red blood cells is easily penetrated by Cl^- and HCO_3^-.

In case of ions, especially, Na^+ and K^+, the permeability is very small. The high concentration of K^+ and low concentration of Na^+ which are often found in cells are maintained by special mechanism which involve the expenditure of energy.

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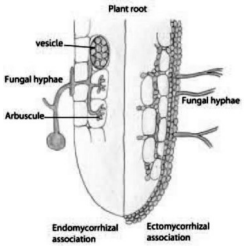
244. Which one of the following pairs is correctly matched:

(a) Rhizobium – Parasite in the roots of leguminous plants
(b) Mycorrhizae – Mineral uptake from soil
(c) Yeast – Production of biogas
(d) Myxomycetes – The disease ring worm.

AIIMS-2003

Ans. (b) : Mycorrhiza is a symbiotic association of a fungus with the roots of a higher plant like Alnus, Myrica, Casuarina called **Ectomycorrhiza,** which lie on surface of the root, help in direct absorption of minerals from the soil over a large area.



- **Rhizobium** is a symbiotic nitrogen-fixing bacteria
- **Methanogenic** bacteria help in production of biogas.

245. Poisons like cyanide inhibit Na^+ efflux and K^+ influx during cellular transport. This inhibitory effect is reversed by an injection of ATP. This demonstrates that

(a) ATP is the carrier protein in the transport system
(b) Energy for $Na^+ - k^+$ exchange pump comes from ATP
(c) ATP is hydrolysed by ATP ase to release energy
(d) Na^+–k^+ exchange pump operates in the cell.

AIPMT-1994

Ans. (b) : Poisons like cyanide inhibit Na^+ efflux and K^+ influx during cellular transport. This inhibitory effect is reversed by an injection of ATP. This demonstrates that Energy for $Na^+ - k^+$ exchange pump comes from ATP.

246. Na^+, K^+ dependent ATP are activity helps in transport of:

(a) K^+ inward, Na^+ outward
(b) K^+ inward only
(c) Na^+ inward only
(d) K^+ outward, Na^+ inward

DUMET-2004

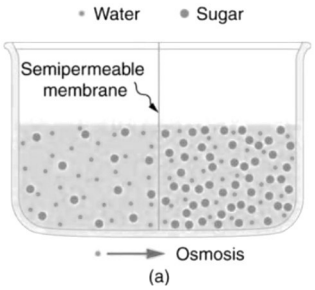
Ans. (a) : $Na^+ - K^+$ ATpase pushes potassium inside the cell membrane against the concentration gradient while simultaneously pumping sodium out of the cell. Pumping against a concentration gradient utilizes ATP energy, making the action of an active transport.
It moves $3Na^+$ out of the cell and $2K^+$ in to the cell per ATP molecules hydrolyzed.

247. Two different concentration solutions are separated by a semipermeable membrane which statement is correct?

(a) Solute will move towards solutions of higher concentration
(b) Solvent will move towards solution of higher concentration
(c) Both solute and solution will move towards higher concentration
(d) None of these

Rajasthan PMT-1997

Ans. (b) : Solvent will move towards the solution of higher concentration. This process is known as osmosis, which is the movement of solvent molecules (usually water) from an area of lower solute concentration across a semipermeable membrane. The solvent moves in order to balance the concentration of solute on both sides of the membrane. The solute itself does not move, as it movement would be prevented by the membrane.



248. The main force for translocation is :

(a) Cohesion force (b) Endosmosis
(c) Electro - magnetic (d) Osmotic power

Rajasthan PMT-1999

Ans. (a) : The cohesion and adhesion forces are an important mechanism in phloem transport. During translocation cohesive force present between water molecules provides stability to them. With the help of adhesive force water molecules stick to the wall of the plant surface resulting information of water column for better translocation in phloem. Translocation refers to the movement of organic nutrients, such as sugars and amino acids, for sources to sink in plants.

249. Casparian strip is made up of

(a) Lignin (b) Pectin
(c) Suberin (d) Cellulose
(e) Starch

CMC Vellore-2008

Ans. (c) : The casparian strip composed of suberin, which is a waxy substance. Suberin is a complex polymer that helps in the waterproofing of plant tissues, particularly in the endodermis of roots. The casparian strip is a specialized band of cell wall material that encircles the endodermal cells in the root of vascular plants. It acts as a barrier, preventing the free movement of water and solutes though the endodermis.

250. The continuous excretion of water substance from stump of a well-watered pot plant after cutting off the shoot slightly above the base is due to :

(a) Root pressure (b) Guttation
(c) Transpiration (d) Imbibition

Punjab MET-2004

Ans. (a) : Root pressure is a physiological process takes place in the xylem tissue of plant roots. The transfer of water from the surrounding soil into the root is caused by the upward force generated by the constant flow of mineral ions into the root cells. The osmotic gradient produced by the accumulation of ions inside the root cells is essentially propels this process the most.

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G. Transpiration

251. Transpiration is measured by

(a) potometer (b) porometre
(c) auxanometre (d) respirometre

UP CPMT-2014 / J&K CET-2013
Punjab MET-2009 / Rajasthan PMT-2009
UP CPMT-2009 / CMC Vellore-2009
Uttarakhand PMT-2006 / Haryana PMT-2005
JIPMER-2005 / JCECE-2003
BHU PMT-2003 / Rajasthan PMT-2002
AIPMT-1992 / Rajasthan PMT-2000, 1998

Ans. (a) : Transpiration is measured by potometer .The rate of loss of water from the leaves of a plant. It is also known as transpirometer.

252. Water reaches to the top of tress of more than 100 feet against gravity, which one of the following is the main phenomenon responsible for this ?

(a) Exudation (b) Guttation
(c) Root pressure (d) Transpiration pull

MHT CET-06.10.2020 Shift-I / JIPMER-2006
BVP-2005 / Haryana PMT-2004
Manipal-2003 / JIPMER-1995

Ans. (d) : Transpiration pull is the suction pressure developed in the plant parts due to transpiration and this is much larger force which makes possible to reach the water at the top of very tall plants.

253. An antitranspirant is

(a) Cobalt chloride (b) Mercury
(c) Potassium (d) Phenyl mercuric acetate

AP EAMCET-25.09.2020 Shift-II / BVP-2012
MGIMS Wardha-2007 / Karnataka CET-2006
AIIMS-1998 / AIPMT-1988

Ans. (d) : An antitranspirant is a substance that is used to reduce the rate of transpiration in plants.
Fungicide PMA-phenyl mercuric acetate act as antitranspriants helps in stomatal activity.

254. Which factor is most important in regularity transpiration?

(a) Temperature (b) Atmospheric Humidity
(c) Light (d) Wind

Manipal-2012 / CG PMT-2011
Karnataka CET-2006 / DUMET-2005
UP CPMT-2003 / AFMC-2002 / AIPMT-1988

Ans. (b) : Transpiration is mainly governed by the vapour pressure gradient between the internal environment of leaf mesophyll tissue and the environment. Thus the most important factor that affects the process of transpiration is the atmospheric humidity.

255. The shade of a tree is cooler than the shade of a roof due to

(a) guttation (b) green leaves
(c) transpiration (d) photosynthesis

J&K CET-2013 /AMU-2011
BHU PMT (Mains)-2006 / AIIMS-1995

Ans. (c) : The loss of water in the form of vapour from the aerial parts of plant (leaves, stem flower and fruits) is called transpiration. 98.99% of total absorbed water is losses only 1-2 % water is used in various metallic active therefore –
Curtis called – *Transpiration is the necessary evil.*
Steward called – *Transpiration is the unavailable evil.*
Shade from trees and plants is actually cooler than the shade from a sunshade, and this is due to the tree transpiration process. This is when a tree releases water vapour from its leaf, and it cools the air around it.

256. Assertion (A) : Epidermis of hydrophytes is useful for absorption and assimilation
Reason (B) : In hydrophytes epidermal cells are devoid of cuticle and contains chloroplasts.

(a) Both A and R are correct and R is the correct explanation of A.
(b) Both A and R are correct but R is not the correct explanation of A
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-22.05.2023, Shift-I

Ans. (a) : Epidermis of hydrophytes is very thin and is devoid of cuticle. This allows the easy absorption of water and dissolved nutrient. The epidermis cells also have chloroplasts, which allows them to carry out photosynthesis. Epidermis is also useful in for absorption and assimilation.
Hence, (a) one is a correct answer.

257. The reaction that do not contribute for proton gradient across thylokoid membrane

(a) Splitting of water molecule on inner side of membrane
(b) Quinone cycle
(c) Removal of protons from stroma for the reduction of NADP
(d) Electron transport from plastocyanin to PST

AP EAPCET-23.05.2023, Shift-I

Ans. (d) : Across thylakoid membranes, the light induced-proton gradient is essential for ATP synthesis. As a result of proton pumping into the thylakoid lumen, an alkaline stromal pH develops, which is required for full activation of pH-dependent Calvin Benson cycle enzymes. Electron transport from plastocyanin to PST reaction do not contribute for proton gradient across thylokoid membrane.
Rest of the other options are contribute for proton gradial across thylokoid membrane.

258. Given below are two statements :
Statement I :The forces generated by transpiration can lift a xylem-sized column of water over 130 meters height.
Statement II : Transpiration cools leaf surfaces sometimes 10 to 15 degrees, by evaporative cooling.
In the light of the above statements, choose the most appropriate answer from the options given below :

(a) Statement I is incorrect but Statement II is correct.
(b) Both Statement I and Statement II are correct.
(c) Both Statement I and Statement II are incorrect.
(d) Statement I is correct but Statement II is incorrect.

NEET (UG) 07.05.2023

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Ans. (b) : Translocation is the movement of substance from one place to another place.

- Xylem transports water from roots to all part of the plant through xylem.
- Phloem transports food material to all part of the plant.
- Xylem and Phloem are two conducting tissues which play an important role in this process. Both are called as Vascular bundles.
- Trees having heights more than a hundred meters have been surviving with the same transpiration pull that keeps any other plant alive. Ex- Red wood.
- The rate of molecular transport is significantly faster at higher temperature. Temperature controlled transportation involves the safe transport of items that can be damaged by extreme temperature. This includes both refrigerated shipping and heated transport.

259. In dicots transpirational loss of water is minimized to the possible extent by

(a) Epidermis (b) Stomata
(c) Cuticle and Trichomes (d) Lenticels

AP EAMCET-11.07.2022 Shift-II

Ans. (c) : In dicot, transpirational loss of water is minimized to the possible extent by cuticle and trichomes. Cuticle is waxy layer, covers leaf surface and reduces the rate of water loss. While trichomes are a small hair like structure to prevent excessive water loss as well as protecting the plant from excessive moisture.

260. The physiological phenomenon which is considered as necessary evil in plants is _____

(a) Photosynthesis (b) Respiration
(c) Transpiration (d) Translocation

AP EAPCET-07.09.2021 Shift-I

Ans. (c) : The loss of water in the form of vapour from the arial parts of plants (stem, leaves, flowers & fruits) is called **transpiration**.

98-99% total absorbed water is lossed only 1-2% water is used in various metabolic activities therefore –

Curtis called – **Transpiration is the necessary evil** and **Steward** called–**Transpiration is the unavailable evil.**

261. The process responsible for facilitating loss of water in liquid form from the tip of grass blades at night and in early morning is

(a) Root pressure (b) Imbibition
(c) Plasmolysis (d) Transpiration

NEET-2020 Phase-I

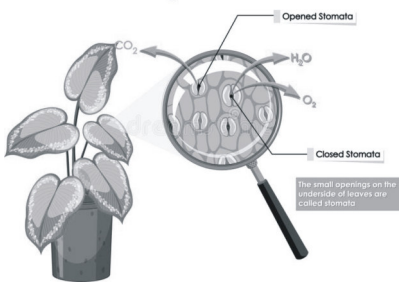
Ans. (a) : The process of Guttation is caused due to root pressure. Root pressure is positive hydrostatic pressure. In this process water is lost from the grass blades tip during night and in early morning.

262. Assertion : Transpiration occurs through stomata.
Reason : Guttation is due to root pressure.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not correct explanation of A
(c) A is true but R is false
(d) A and R are false

AIIMS-26.05.2018 Shift-I

Ans. (b) : Transpiration is the process of water movement through a plant and its evaporation from aerial parts, such as leaves, stem and flowers. It occurs mostly at the leaves while their stomata are open for the movement of CO_2 and O_2 during photosynthesis. At night in some plants, root pressure caused guttation of drops of xylem sap from the tips of leaves. Xylem sap will exude from the cut stem for hours or days due to root pressure.



263. Stomatal movement is not affected by

(a) Temperature
(b) Light
(c) CO_2 concentration
(d) O_2 concentration

NEET-2018

Ans. (d) : The opening and closing of stomata are affected by light, temperature, mineral element and CO_2 concentration. But the stomata opening and closing not depend upon O_2 concentration.

Blue and red light plays important role in photosynthesis and stomata opening.

Deficiency of certain minerals elements like nitrogen phosphorus and potassium affect the opening and closing of stomata.

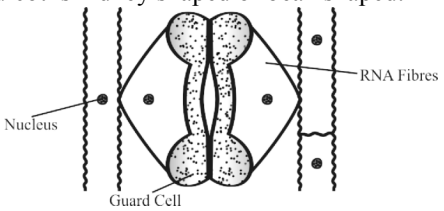
Low CO_2 concentration includes stomata opening and high CO_2 concentration referred stomata close.

264. Stomata in grass leaf are

(a) Dumb-bell shaped (b) Kidney shaped
(c) Barrel shaped (d) Rectangular

NEET-2018

Ans. (a) : Grass leaf belong to the monocot, and guard cell in monocot is dumb-bell shaped where as the guard cell of dicot is kidney shaped or bean shaped.



Dumb-bell shaped guard cell in monocot

Stomata are tiny pore or holes found to be present in the epidemic of leaves.

The major function of stomata is to regulate the gaseous exchange and process of transpiration.

265. Which of the following facilitates opening of stomatal aperture?

(a) Contraction of outer wall of guard cells
(b) Decrease in turgidity of guard cells
(c) Radial orientation of cellulose microfibrils in the cell wall of guard cells.

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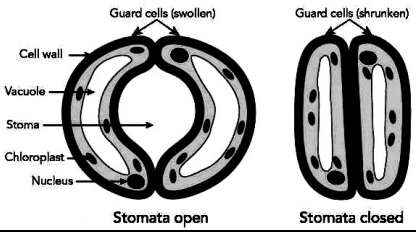
(d) Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells

NEET-2017

Ans. (c) : Radial orientation of cellulose microfibrils in the cell wall of guard cells facilitates opening of stomatal aperture. In the guard cells of stomata the microfibrils are made up of cellulose oriented radically rather than longitudinally which help to stomatal opening.



266. Wilting of leaves at noon and their recovery toward evening is known as

(a) Incipient wilting (b) Temporary wilting
(c) Midday desiccation (d) Permanent wilting

MGIMS Wardha-2009

Ans. (b) : Wilting of leaves at noon and their recovery toward evening is known as temporary wilting.
Wilting – It is term commonly used to describe the drooping or sagging of plants leaves due to lack of water or other environmental stress factor.

267. Transpiration facilitates

(a) Electrolyte balance
(b) Opening of stomata
(c) Absorption of water by roots
(d) Excretion of minerals

Manipal-2009 / Karnataka CET-2009

Ans. (c) : Transpiration facilitates Absorption of water by roots. The roots to other section of the plant is aided by transpiration.

268. Maximum transpiration occurs in :

(a) Algal cells (b) Xerophytic plants
(c) Mesophytic plants (d) Hydrophytic plnats

DUMET-2001

Ans. (c) : Transpiration occurs in almost all plants, but maximum transpiration is seen in Mesophytes. In Mesophytes, stomata are present on either side of the leaf resulting maximum transpiration whereas in xerophytes minimum transpiration occur because of sunken stomata present in the leaf.

269. Stroma in the chloroplasts of higher plants contains

(a) Light-independent reaction enzymes
(b) Light-dependent reaction enzymes
(c) Ribosomes
(d) Chlorophyll

Haryana PMT-2010

Ans. (a) : Light independent reaction enzymes are found in stroma of chloroplast when dark reaction is occurs.

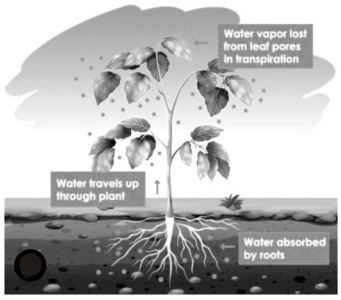
- Light depended reaction enzyme are found in grana of chloroplast where light reaction is occurs and ATP, NADPH is formed.
- Ribosomes are a part of cell content where protein synthesis is occurs.

270. Wilting occurs when there is

(a) Transpiration higher than absorption.
(b) Absorption higher than transpiration.
(c) Higher relative humidity of atmosphere.
(d) Excess root pressure.

AMU-2008 / VMMC-2008 / AFMC-2004

Ans. (a) : In summer due to excessive transpiration maximum water loss occur in plants. The amount of water lost during transpiration is much greater than amount of water absorbed by root from the soil. As a result turgidity of non woody parts lost due to loss in turgor pressure of non lignified cells. Wilting destroy the ability of plant to grow and transpire. If it present for a long time it may lead to death of plant.



271. Element which regulates stomatal movement

(a) Potassium (b) Sodium
(c) Sulphur (d) Phosphorus

BCECE-2015
J&K CET-2007
Haryana PMT-2005

Ans. (a) : The guard cells contain phototropic proteins which sense light and the transpiration is triggered. The potassium ion channels in the guard cells are activated by calcium and not by potassium as potassium only creates a potential difference for closing and opening of stomata.

272. If concentration of CO_2 in atmosphere is increased, the stomata are closed in

(a) dark (b) light
(c) Both[a] and [b] (d) None of the above

CG PMT-2011

Ans. (c) : Usually, the stomata open during the day time and close during the night time. But this is not generally seen in desert plants like a cactus. They are also known as succulent plants. This is because of very high temperatures and scarcity of water in deserts. During the day time the stomata remain close but at night when the temperatures reduce the stomata opens to carry out photosynthesis. Such behavior of stomata is an adaptation of plants for the survival in place like deserts.

273. Transpiration rate in Sorghum is comparatively higher than maize. This is due to

(a) Increased shoot/root ratio
(b) Increased rate of respiratory quotient
(c) Increased rate of photosynthesis
(d) Decreased root/shoot ratio

BVP-2013

Ans. (a) : Due to increased shoot / root ratio sorghum has extensive root system as compared to maize hence it has more rate of transpiration.

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274. Transpiration differ from evaporation in
(a) rate of water loss
(b) transpiration is a physiological process whereas, evaporation is physical process
(c) transpiration is a physical process, while evaporation is physiological process
(d) frequency of water loss

BVP-2012 / MGIMS Wardha-2007

Ans. (b) : Transpiration differ from evaporation in transpiration is a physiological process whereas, evaporation is physical process.

275. Plants growing on hills show
(a) higher rates of transpiration
(b) lower rates of transpiration
(c) same rate of transpiration as in plants
(d) lower rate of transpiration provided the stomata are sunken

CMC Ludhiana-2007

Ans. (a) : Plants growing on hills show higher rates of transpiration due to less atmospheric pressure. As the atmospheric pressure decreases density of external environment increases. This allow rapid diffusion of water and increase the rate of transpiration.

276. Wilting in plant occurs due to:
(a) blockage of xylem
(b) blockage of phloem
(c) both a and b
(d) increased transpiration

AMU-2011 / AFMC-2005, 2001

Ans. (a) : Wilting in plant occurs due to blockage of xylem. Wilting is the visible mark of a plant loosing more water through transpiration. Wilting in plant occurs due to increased transpiration.

277. Lenticels and hydathodes are small pores with which of the following common attributes?
(a) They allow exchange of gases
(b) Their opening and closing is not regulated
(c) They always remain closed
(d) They are found on the same organ of plants

Uttarakhand PMT-2007 / UP CPMT-2001

Ans. (b) : Hydathodes are water secreting pores found on leaves and remain always open, while lenticels are found on bark and fruits and allow gaseous exchange. Opening and closing of both is not regulated in contrast to stomata.

278. Transpiration rate is depended upon : (1) stomata frequency (2) Position of stomata (3) state of stomata (4) epidermal cells
(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2005

Ans. (a) : Transpiration rate is depended upon: Stomata frequency, position of stomata and state of stomata.

279. Water lost by transpiration is:
(a) rich in dissolved minerals
(b) rich in solutes
(c) pure water
(d) rich in dissolved salts

Karnataka CET-2002

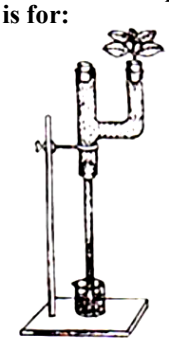
Ans. (c) : The loss of water in the form of vapour from the aerial parts of plant (leaves, stem flower and fruits) is called transpiration. 98.99% of total absorbed water is losses only 1-2% water is used in various metallic active.
Water lost by transpiration in the form of water vapour. Water vapour is almost completely devoid of dissolved salts or solutes, therefore water lost by transpiration is for all practical purposes, pure water.

280. During hot days, the leaves wilt because :
(a) the heat affects the chloroplasts
(b) of excess of transpiration
(c) of excess of photosynthesis
(d) too much CO_2 is given out

JIPMER-1999

Ans. (b) : The loss of water in the form of vapour from the aerial parts of plant (leaves, stem flower and fruits) is called transpiration. 98.99% of total absorbed water is losses only 1-2% water is used in various metallic active.
During hot days or dry day (or after several days with no rain or watering), transpiration causes more water to be lost and the water balance within the plant can get thrown off. In plants wilting is a condition to lose the turgidity of cells and young leaves and stem droop. It happens because of the excess of transpiratory water loss over absorption.

281. The experimental set up shown in the adjacent diagram is for:



(a) The demonstration of development of suction force due to transpiration
(b) Measuring the rate of transpiration
(c) The demonstration of ascent of sap.
(d) The demonstration of anaerobic respiration

Karnataka CET-2003

Ans. (b) : The experimental set up shown in the diagram is a simple potometer used for measuring the rate of transpiration.
In a elementary potometer, water lost by the plant is replaced by water taken from the glass tube, which causes the mercury column to rise.
The rate of loss of water and entrance of CO_2 is called the transpiration ratio.
In C_3 plants 200-400 mole H_2O losses per CO_2 mole enter.
The rate of transpiration is directly proportional to the temperature.

282. Primitive types of stomata are found in the
(a) leave of moss of plant
(b) axis of the moss plant
(c) apophysis of capsule of moss
(d) All of the above

CG PMT-2007 / AIIMS- 1998,99

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Ans. (c) : Primitive types of stomata are found in the apophysis of capsule of masses. Primitive forms of stomata are visible in the spore bearing capsules of mosses. These type of stomata present in the epidermal layer of the leaves, stem, or other vegetative parts.

283. The condition under which transpiration would be most rapid
(a) high humidity
(b) excess of water in soil
(c) low humidity, high temperature, guard cells are turgid (open) and moist soil
(d) low velocity of wind

Manipal-2013

Ans. (c): The following condition under which transpiration would be most rapid such as low humidity, high temperature, guard cells are turgid (open) and moist soil.
The rate of temperature is directly proportional to the temperature increase the temperature, increase the rate of transpiration. If water is available in the soil, rate of transpiration increase.

284. Scotoactive stomatal movement can be observed in the leaves of:
(a) Vallisneria (b) Potamogeton
(c) Bryophyllum (d) Nerium

AP EAMCET-2001

Ans. (c) : Scotoactive stomata are the stomata that open in the dark or open during the night in absence of the sunlight to reduce the rate of transpiration it is xerophytic feature. These stomata are found in plants like Bryophyllum. These stomata perform their activity during the night and close during the day in presence of the sunlight.

285. Forces generated by transpiration can create pressure sufficient to lift water even upto height of
(a) 130 feet (b) 130 metre
(c) 230 feet (d) 230 metre

AMU-2012

Ans. (b) : The loss of water in the form of vapour from the aerial part of plant is called transpiration. Transpiration pull results from the evaporation of water from the surface of cells in the leaves.
Force generated by transpiration can create pressure to lift water up to 130 meters.

286. Hydathode are found in
(a) leaf (b) stem
(c) flower (d) root

CG PMT-2006

Ans. (a) : The Hydathodes are also known as the water stomata, commonly found in angiosperm. They are found at the tips of the veins of the leaves. It is type of secretary tissue in leaves that secretes water through pores in the epidermis of leaves. It is mainly found in aquatic plants such as Ranunculus fluitans.

287. Water is released as droplet, this is known as
(a) Root pressure (b) Transpiration
(c) Guttation (d) Evaporation

VMMC-2011

Ans. (c) : Guttation is the process of secretion of water in the form of droplets from the plants. In this process water lost mostly from margin of leaves. The process of guttation was first absorbed by Berger Stein in 1887.

288. Of all the environmental factors which is the most influential in determining the rate of transpiration?
(a) Relative humidity of atmosphere
(b) Temperature
(c) Light
(d) Water

Karnataka CET-2008

Ans. (a) : Relative humidity of atmosphere is the most influential in determinig the rate of transpiration. Transpiration is the evaporation of water from plants occurring through stomata. As the relative humidity of the air surrounding the plant rises the transpiration rate falls.

289. Transpiration is manifestation of
(a) turgor pressure (b) wall pressure
(c) root pressure (d) None of these

UP CPMT-2011

Ans. (a): Transpiration is the manifestation of turgor pressure. Turgor pressure is the water pressure within the stomata regulates the opening and closing of stomata.
• **Wall pressure** It is the pressure exerted on the content of a plant cell by the cell wall that is equal in force and opposite in direction to the turgor pressure.
• **Root Pressure** in plant force that help to drive fluid upward into the water-conducting vessels (xylem).

290. Potometer works on the principle of
(a) amount of water absorbed equals the amount transpired
(b) osmotic pressure
(c) root pressure
(d) potential difference between the tip of the tube and that of the plant

JIPMER-2007

Ans. (a) : Potometer is a type of measuring instrument which is used to measure the rate of transpiration. Poto meter works on the principle of amount of water absorbed equal to the amount of water lost through transpiration. Potometer is made up of glass and consist of a long tube which is bent at the right angles.

291. Which of the following statements is not true for stomatal apparatus?
(a) Inner walls of guard cells are thick
(b) Guard cells invariably possess chloroplasts and mitochondria
(c) Guard cells are always surrounded by subsidiary cells
(d) Stomata are involved in gaseous exchange

NEET (Karnataka)-2013

Ans. (c) : Stomatal aperture is present between the guard cells. Guard cells are not always surrounded by accessory cells or subsidiary cells.
The pore and guard cells together called the stomata. It consists of two specialized epidermal cells called guard cell. Each guard cell has inner thick non elastic wall towards the concave side and outer thin elastic wall towards convex side. Both guard cells are surrounded by modified epidermal cells called subsidiary cells or accessory cells but in monocots guard cells are thick in the middle and thin at the end.

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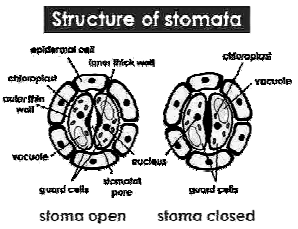


292. Which condition favours guttation?

(a) High humidity (b) Low humidity
(c) More transpiration (d) Bright sunlight

UP CPMT-2013

Ans. (a) : High humidity is the condition that favours guttation. When the humidity is high, the moisture in the air reduces the rate of water loss through transpiration. This allows the plant to accumulate water in its tissues, and excess water can then be forced out through specialized structure called hydathodes, resulting in guttation. It is due to the root pressure.

293. Select the correct statement: (1) Lenticel is the exit route for transpiration (2) The action spectra of transpiration is blue and red (3) Transpiration helps the plant to remain cool (4) Transpiration can be measured by photometer

(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 1, 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2006

Ans. (b) : The loss of water in the form of vapour from the aerials parts of a plants is called transpiration.
Lenticels are the pores, on the bark of woody stem. The transpiration through the lenticels called lenticular transpiration. 0.1-1% of total transpiration occurs through lenticels it is continuous throughout the day and night.

- Most of the transcription is stomatal the action spectrum of transpiration.
- A photometer is used to determine the intensity of light.
- Transpiration can be measured by potometer.

294. Lenticels are involved in:

(a) Photosynthesis (b) Transpiration
(c) Gaseous exchange (d) Food transport

NEET-2013 / AIPMT-2002

Ans. (c) : Lenticels are involved in Gaseous exchange. It function as a pore providing a pathway for the direct exchange of gases between the interval tissue and atmosphere. The lenticels found in the epidermis of different plant organ (stem petiole fruits) made up of parenchymatous cell.

295. Which one of the following is NOT an antitranspirant?

(a) PMA (b) BAP
(c) Silicon oil (d) Low viscosity

Karnataka CET-2011

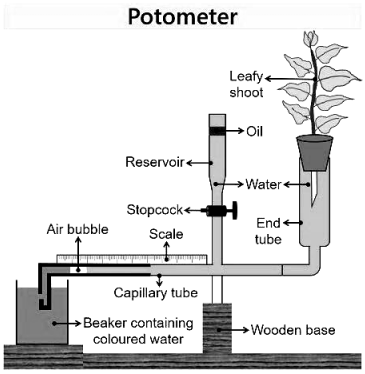
Ans. (b) : When excessively transpiration occurs in the plant which increase the loss of water in the form of vapour which is not desired. Chemical applied on the leaves of plant reduce the rate of transpiration that is called antitranspirant. Antitranspirant are used to improve the crop yield in drought affected area, PMA (Phenyl mercuric acetate) and silicon oil are Antitranspirants BAP (Benzylaminopurine) is not an Antitranspirants.

296. Potometer works on the principle of –

(a) Potential difference between the tip of the tube and that of the plant
(b) Amount of water absorbed equals the amount transpired
(c) Osmotic pressure
(d) Root pressure

Uttarakhand PMT-2010
AIPMT-2005

Ans. (b) : The potometer is an instrument used to measure the rate of water uptake or transpiration in plants.



Principle - It works on the principle that the amount of water absorbed by a plant shoot is almost equal to water lost through transpiration.
Evaporation of water in the form of vapours from aerial parts of living plants is known as transpiration.
In transpiration 98-99% of total absorbed water is lossed only 1-2% water is used in various metallic activity.

297. Stomata of a plant open due to:

(a) Influx of potassium ions
(b) Efflux of potassium ions
(c) Influx of hydrogen ions
(d) Influx of calcium ions

AIPMT-2003

Ans. (a): Stomata of a plant open due to the influx of K^+ ions. K^+ ions enter into the guard cell and form potassium malate therefore, increased osmotic concentration and endosmosis occur, turgor pressure increase and guard cells becomes turgid and stomata open.

298. In succulent plants the stomata open in night and close in day. Which among the following would be best hypothesis to explain the mechanism of stomatal action in night only?

(a) CO_2 accumulates, reduces pH, stimulate enzymes resulting in accumulation of sugars
(b) increase in CO_2 concentration, conversion of organic acids into starch resulting in the increased conversion into sugars resulting in K^+ transport
(c) low CO_2 concentration accumulates organic acids resulting in the increased conversion into sugar resulting in K^+ transport
(d) low CO_2 concentration accumulates organic acids resulting in the increased concentration of cell sap

AIIMS-2008

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Ans. (b) : In succulent plants, stomata open during the night and closed during the day time such stomata are called Scotoactive stomata.

(1) In these plant, in night acidification occurs due to the incomplete oxidation of carbohydrate

(2) During the night acidifications occurs and form malic acid which enter the vacuole and stomata open.

(3) During night –

$$2C_6H_{12}O_6 + 3O_2 \rightarrow 3C_4H_6O_5 + 3H_2O$$

Malic acid (leading stomata open)

During day time-

$$C_4H_6O_5 + 3O_2 \rightarrow 4CO_2 + 3H_2O$$

(Leading stomata close)

299. Match the Column-I with Column-II.

Column-I	Column-II
A. Bulliform cells	**1. Stomata**
B. Guard cells	**2. Aerating pore**
C. Lenticels	**3. Accessory cells**
D. Subsidiary cell	**4. Isobilateral leaf**

(a) A-1, B-2, C-3, D-4 (b) A-3, B-1, C-2, D-4

(c) A-4, B-1, C-2, D-3 (d) A-4, B-3, C-2, D-1

AIIMS-2014

Ans. (c)

A. Bulliform cells	4	Isobilateral leaf
B. Guard cells	1	Stomata
C. Lenticels	2	Aerating pore
D. Subsidiary cell	3	Accessory cells

- **Bulliform cells** are large, bubble shaped epidermal cell found on the top surface of leaves in monocot. It also called as motor cell. They are essential for water storage.
- **Lenticel** It is porous tissue which contain cells with large intercellular space. The main function is gaseous exchange.

300. Stomata opens

(a) In day time – For gaseous exchange

(b) In day time – No gaseous exchange

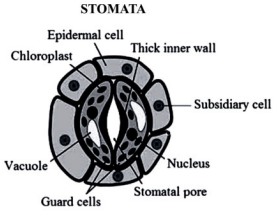
(c) In night time only – For gaseous exchange

(d) In night time only – No gaseous exchange.

AIIMS-2001

Ans. (a) : Stomata are open for gaseous exchange, but are also the main source of transpiration. In majority of plants stomata open in the presence of light. i.e. open in daytime and close in darkness (night).

Usually stomata open during the day time and closed in night such stomata are called **photoactive stomata**. But in succulent plant stomata open during night and close during the day time such stomata are called **scotoactive stomata**.



301. Stomata open and close due to

(a) circadian rhythm

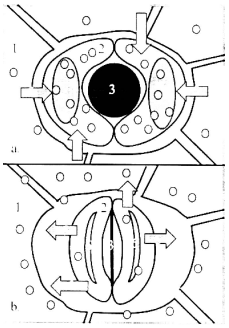
(b) genetic clock

(c) pressure of gases inside the leaves

(d) turgor pressure of guard cells

AIPMT-1988

Ans. (d) :



Mechanism of opening and closing of stomata:-

Opening and closing of stomata depends upon the turgidity and flaccidity of guard cells and the flaccidity of guard cells depends upon the osmotic concentration of guard cells. Usually during the day time stomata open.

The osmotic pressure of the guard cells become high as compression to subsidiary cells or surrounding cells than water enters from low osmotic pressure to high osmotic pressure i.e. water moves from surrounding cells into the guard cells by the process **endosmosis** and guard cells becomes turgid and stomata open.

During the night stomata close, the osmotic pressure of guard cells low as compression to surrounding cells. Water losses from the guard cells to the subsidiary cells or surrounding cells by the **exosmosis** guard cells becomes flaccid and stomata close.

Exception:- In succulent, xerophytic plants stomata open during night called scotoactive stomata.

302. In guard cells when sugar is converted into starch, the stomatal pore

(a) Closes completely (b) opens partially

(c) opens fully (d) remains unchanged

AIPMT-1992

Ans. (a) : In guard cells when sugar is converted into starch, the stomatal pores close completely.

Starch $\rightleftharpoons$ Sugar interconversion theory:-

Initially this theory was proposed by Lloyd 1908 and finally by the scarth 1932.

According to scarth (1932)- During day time photosynthesis and respiration both occurs CO_2 is utilized in photosynthesis and number of hydrogen ions decreases and pH increases. Stomata open but during the night no photosynthesis, only respiration occurs. CO_2 released not utilized but number of H^+ ions increase and pH decrease thus stomata close.

303. At constant temperature, the rate of transpiration will be higher at

(a) sea level (b) 1 km below sea level

(c) 1 km above sea level (d) 1.5km above sea level

AIPMT-1992 / BVP-2006

Ans. (d) : Mean sea level is an average surface level of one or more among Earth's coastal bodies of water from heights such as elevation may be measured. At constant temperature, the rate of transpiration will be higher at 1.5 km above the sea level.

@apna_pdf

304. Conversion of starch to organic acids is required for

(a) stomatal opening (b) stomatal closing
(c) stomatal formation (d) stomatal activity

AIPMT-1992

Ans. (a) : Stomata are pores on the leaf surface, which are formed by the pair of curved, tubular guard cells an increase in turgor pressure deform the guard cells, resulting in the opening of the stomata.

During stomatal opening starch get converted into organic acids like malic acid.

305. In terrestrial habitats, temperature and rainfall conditions are influenced by

(a) water transformations (b) transpiration
(c) thermoperiodism (d) translocation

AIPMT-1992

Ans. (b) : The loss of water in the form of vapour from the aerial parts of plant (leaves, stem flower and fruits) is called transpiration. 98.99% of total absorbed water is losses only 1-2% water is used in various metallic active.

- In terrestrial habitats, temperature and rainfall conditions are influenced by transpiration.

Transpiration increases with increase in temperature and decrease with rainfall condition.

The rate of transpiration is directly proportional to the saturation deficit of atmosphere.

306. Transpiration is a necessary evil, this statement belongs to:

(a) Burgerstein (b) Reschke
(c) Curtis (d) Willmer

CG PMT-2005
Manipal-2002

Ans. (c) : Transpiration may be regarded as beneficial to the plants due to its role in ascent of sap absorption and transpiration of mineral salts and in the regulation of temperature of plant tissues, but transpiration also causes loss of water i.e. 98-99% of total absorbed water is losses only 1-2% water is used in various metabolic activity therefore, Curtis called **transpiration is a necessary evil**.

307. Lenticular transpiration takes place in

(a) fruits (b) woody stems
(c) leaves (d) all of these

WB JEE-2007

Ans. (b) : Lenticular transpiration takes place in the woody stem.

Lenticels are the pores, on the bark of woody stem.

The transpiration through the lenticels called **Lenticular Transpiration.** 0.1 – 1% of total transpiration occur through Lenticels it is continuous throughout the day and night.

308. Stomatal opening is affected by

(a) nitrogen concentration, carbon dioxide concentration and light
(b) carbon dioxide concentration, temperature and light
(c) nitrogen concentration, light an temperature
(d) carbon dioxide concentration, nitrogen concentration and temperature

DUMET-2011

Ans. (b) : Stomatal opening, which refers to the process by which stomata regulate gas exchange in plants, can be influenced by various factors. Stomata tend to open in response to light. Temperature can affect stomatal opening indirectly which impact on the rate of transpiration.

309. Transpiration occurs maximum when:

(a) high humidity present in atmosphere
(b) high water present in soil
(c) dry environment with high temperature
(d) wind is not blowing

Rajasthan PMT-1997, 1999

Ans. (c) : Transpiration in plants can vary depending on various factors. There are few conditions under which transpiration tends to occur at its maximum rate. High temperature generally increase transpiration rate. As temperature rise, the water potential gradient between the plant and atmosphere increases. Transpiration rates are typically higher in drier environments with lower humidity.

310. In which of the following plants, there will be no transpiration ?

(a) Plants living in deserts
(b) Aquatic, submerged plants
(c) Plants growing in hilly regions
(d) Aquatic plants with floating leaves

Karnataka CET-2005

Ans. (b) : There will be no transpiration occurs in aquatic, submerged plant because in hydrophytic plants stomata are completely absent in the leaves. Transpiration is a process that involves loss of water vapour through the stomata of plants. It helps in regulating temperature of plant.

311. Which one is not related to transpiration

(a) Regulation of plant body temperature
(b) Absorption and distribution of mineral salts
(c) Circulation of water
(d) Bleeding

CG PMT-2004

Ans. (d) : Bleeding is the release of blood from a broken blood vessels, either inside or outside of the human body but transpiration is related to elimination of excess water from the plant body. It is generally the evaporation of water from the surface of the leaves.

312. Which of the following theory gives the latest explanation for the closure of stomata?

(a) ABA theory
(b) Munch theory
(c) Starch glucose theory
(d) Active K^+ transport theory

Manipal-2008
BHU PMT-2001

Ans. (d) : The active potassium transport theory given by Levitt and detail study by Raschke 1975 and Bolwing 1976 it is the most widely accepted theory for opening and closing of stomata.

313. Opening and closing of stomata is controlled by

(a) abscisic acid (b) CO_2 concentration
(c) light intensity (d) All of these

WB JEE-2015

@apna_pdf

Ans. (d) : The opening and closing of stomata is controlled by the light intensity, humidity carbon dioxide concentration, water and Abscisic acid. When the root system scoured the in availability of water, then plant release of Abscisic acid, which control stomata closing.

314. Guttation is a process of loss of water in
(a) liquid form containing dissolved minerals
(b) liquid form without dissolved minerals
(c) vapour form with minerals
(d) vapour form without minerals

WB JEE-2015

Ans. (a) : Guttation:- During the early morning or night, worm soil and high humidity more absorption of water, less transpiration water comes out in the form of liquid on the margin of lamina and the tip of the veins in the form of droplets without injured is called the guttation. Gutted water is impure has salt, sugar, inorganic and organic substances.

315. Opening and closing of stomata is due to
(a) hormonal change in guard cells
(b) change in turgor pressure of guard cells
(c) gaseous exchange
(d) respiration

Rajasthan PMT-2007

Ans. (b) : The opening and closing of stomata depend on the turgor pressure caused by the osmotic flow of water in the guard cells.

H. Phloem Transport : Flow from source to sink

316. In which form does the food transported in plants?
(a) Sucrose (b) Fructose
(c) Glucose (d) Lactose

Assam CEE-2014 / JIPMER-2010
JIPMER-2009 / UP CPMT-2008
Rajasthan PMT-2008 / CG PMT-2008
BVP-2006/UP CPMT-2006/BHU PMT (Screening)-2005
DUMET-2002 / Haryana PMT-2000 / AIPMT-1993

Ans. (a) : The glucose synthesized in the leaves by the process of photosynthesis. The glucose are transported to other regions of the plant body after conversion to sucrose. Since it is non-reducing and water soluble it can be transported easily too. Therefore, food is transported in plants in the form of sucrose.
In most of the species, sucrose is the principal form of carbohydrate translocated throughout the plant by the phloem. Starch is an insoluble stable carbohydrate reserve that is present in almost all plants.

317. Identify the correct statements regarding Mass flow hypothesis.
(A) Mass flow is faster than diffusion.
(B) Mass flow is the result of pressure difference between the end points.
(C) Different substances involved in mass flow move at different paces.
(D) Mass flow can result through either a positive or a negative hydrostatic pressure gradient
Choose the correct answer from the options given below:
(a) (A), (B), (C) only (b) (A), (B), (D) only
(c) (A), (C), (D) only (d) (B), (C), (D) only

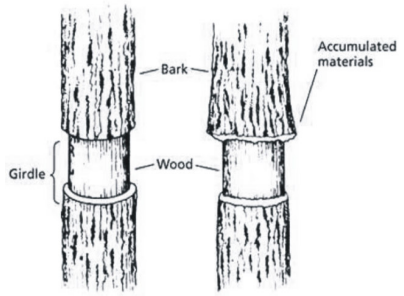
RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : German plant physiologist Ernst Munch proposed 'The mass flow hypothesis' in 1930, in this hypothesis movement of sap through the phloem tissue in the plants.
• The mass flow hypothesis states that a never ending flow of water plus (+) dissolved nutrients between source and sink.

318. "Girdling Experiment" was performed by Plant Physiologists to identify the plant tissue through which:
(a) osmosis is observed
(b) water is transported
(c) food is transported
(d) for both water and food transportation

NEET-2022

Ans. (c) : The experiment that is used to identify the tissue through which food is transported is girdling experiment. In this experiment, the removal of all the tissues outside the vascular cambium (bark , cortex, and phloem) in woody stem except for the xylem. Since the woody xylem part present on the inner side remains interact, water and nutrient reach in leaves.
But after photosynthesis food is not transported to other parts below the girdle since the phloem part is removed. So it is observed that there is an accumulation of the food/sugar just above the girdle region.
This experiment shows that the phloem tissue aids food transport.
In vascular plants xylem is main water conducting tissue
Osmosis It is a special type of diffusion occurs through the membrane when two solution are separated by a semi permeable membrane the water (solvent) moves from low concentration solution towards the high concentration.



319. The ascent of xylem sap in plants is mainly accomplished by the:
(a) size of the stomatal aperture
(b) distribution of stomata on the upper and lower epidermis
(c) cohesion and adhesion between water molecules
(d) root pressure

NEET (Re-Exam)-04.09.2022

Ans. (c) : The upward movement of water against gravity or ascent of sap in plants depends on mainly cohesion and adhesion of water molecules.
Force of attraction between molecules of the same substance is called cohesive force. Force of attraction between molecules of different substances is called adhesive force.

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The transpiration pull or tension, cohesion properly of water and hydration of cell wall (adhesion) are collectively responsible for ascent of sap.

320. In sieve tubes source to sink pressure gradient is maintained by

(a) Phloem parenchyama (b) Sieve cells
(c) Sieve tubes only (d) Companion cells

AP EAPCET-12.07.2022 Shift-I

Ans. (d) : The companion cells help in maintaining the pressure gradient in the sieve tube, the pressure gradient can be defined as differences in pressure that decide the direction of liquid flow.

Phloem parenchyma store food and other substances like resin, latex and mucilage. Sieve tubes are responsible for the transport of food throughout the plant body.

Sieve cells are less specialized cells for the transport of food.

321. Choose the correct order of statements regarding the translocation of sucrose.

(A) Loading of sugars into phloem setup a water potential gradient that facilitates mass movement in phloem
(B) Sucrose moves into companion cell and then to phloem sieve tube cell by active transport
(C) A hypertonic condition in phloem facilitating water from the xylem into phloem by osmosis.
(D) All sink sugars are transported out of the phloem producing high water potential with returning of water to xylem.
(E) With increase in hydrostatic pressure in phloem pressure flow begin and sap moves through phloem.

Options:

(a) B, C, D, A, E (b) A, C, B, D, E
(c) A, C, D, B, E (d) E, B, C, A, D

TS EAMCET-28.09.2020 Shift-I

Ans. (a) : Sucrose is actively transported from source cells into companion cells and then into the sieve tube elements then hypertonic condition in phloem. The facilitating water from xylem into phloem by osmosis then sink sugar transported out of the phloem producing high water potential loading, of sugar into phloem setup water potential gradients and hydrostatic pressure in phloem in phloem pressure.

322. Which of the following is the sink end of the plant?

(a) Stem tuber (b) Cotyledon
(c) Leaf (d) Apical bud

MHT CET-2019

Ans. (d) : In the phloem sugar move from "source" to "sink" because plant need an energy source to grow. Sugar produced photosynthesis by leaves and transported to sits of growth where sugar need.

- According to sugar deliver like root, young shoot, flower, seed, and fruits, root, tubers and bulbs are called sinks.
- Stomata and mature leaves are not sinks

323. Arrange the given events that occur in phleom for removal of water from phleom to xylem

(I) Incoming sugars are actively transported out and removed as complex carbohydrate
(II) Increase of water potential
(III) Increase of hydrastatic pressure in seive tubes
(IV) Transport of water in to sieve tubes by osmosis

Options:

(a) IV III I II (b) IV I III II
(c) IV II III I (d) I II III IV

AP EAMCET-24.04.2019 Shift-I

Ans. (c) : The translocation of sugars from source to sink is called the pressure flow hypothesis.

Sugar is transported to phloem sieve tube in the form of sucrose. This process of loading at source produces a hypertonic condition in phloem. Water moves into phloem by osmosis.

The loading of the phloem sets up a water potential gradient that facilitates the mass movement in the phloem.

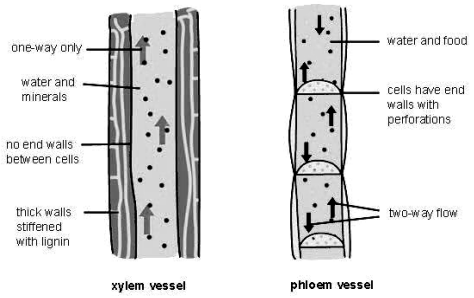
As hydrostatic pressure in the sieve tube of phloem increases. Mean while, at the sink, incoming sugars are actively transported out of the phloem.

324. What is the direction of movement of sugars in phloem?

(a) Upward (b) Downward
(c) Bi-directional (d) Non-multidirectional

NEET-2019
AIPMT-1997

Ans. (c) : The phloem transport is bidirectional,l because sucrose gets accumulated in the phloem tissue and absorbs water creating high turgor pressure.



325. Fensom and Jones suggested which of the following method for translocation of solute ?

(a) Osmosis (b) Plasmolysis
(c) Diffusion (d) Electro-osmosis

Haryana PMT-2004
Manipal-2003

Ans. (d) : The theory of electro-osmosis was proposed by Fensom (1957) and Jones (1958). According to this theory the solute moves in positive direction of electrical gradient along with K^+ ions.

326. In higher plants, transport of food material occurs through

(a) Companion cells (b) Sieve element
(c) Tracheids (d) Transfusion tissue

Rajasthan PMT-2011

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Ans. (b) : Sieve element are consists of sieve cells. These are the main component of phloem tissue and help in transport of food materials (sugar, amino-acids, fatty acids, etc) in different area of the plants. In angiosperms sieve. Element are companion cells and sieve tubes. Whereas in pteridophytes and gymnosperms they posses sieve cells.

327. Removal of ring wood of tissue outside the vascular cambium from the tree trunk kills it because

(a) water cannot move up
(b) food does not travel down and roots become starved
(c) shoot become starved
(d) annual ring are not produced

Uttarakhand PMT-2007

Ans. (b) : Term phloem was used by Carl Nageli on the basis of origin phloem is two types primary phloem and secondary phloem.

Phloem is present above the vascular cambium, that helps in transports of food materials to the roots. If the outer ring along with phloem is removed, than root will be starved and the food material will not be distributed to the roots.

328. The translocation of organic solutes in sieve, tube members is supported by

(a) P-proteins
(b) mass flow involving a carrier and ATP
(c) cytoplasmic streaming
(d) root pressure and transpiration pull

Manipal-2012

Ans. (b) : The translocation of organic solutes in sieve, tube members is supported by the mass flow process, which is an energy dependent process that require ATP and carrier molecules. The food is transported from the source area (synthesizing site) to sink area (utilization site) of different part of the plants. The food is synthesized in the form of glucose by photosynthesis. Glucose is converted into sucrose after conversion of sucrose it moved into the sieve tube cells by active transport. It causes an influx of water from the xylem, thus increase the hydrostatic pressure. The solution in the phloem then moves to the sink the sucrose is actively transported out from the phloem.

329. Phloem sap is mainly made up of

(a) Water and sucrose
(b) Water and minerals
(c) Oligosaccharides and hormones
(d) None of the above

AMU-2012

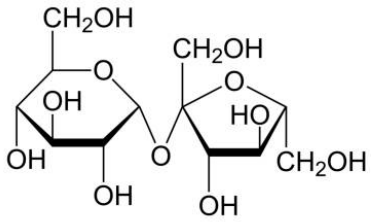
Ans. (a) : The phloem sap contain high quantities of sugar which dissolved in water. Its transport from the source of supply end (region of manufacture or storage) to the region of utilization or sink. The sucrose (non reducing sugar) is a more stable compound and suitable for long distance transport. Phloem sap travels from a location with higher osmotic pressure to an area with law pressure.

330. Carbohydrates is synthesised by process of photosynthesis mainly by leaves of green plants. In which form of sugars, the manufactured, carbohydrates is translocated to another region of plants?

(a) Glucose (b) Sucrose
(c) Maltose (d) Fructose

UP CPMT-2014

Ans. (b): Translocation of photosynthesis products (organic food) usually takes place in form of sucrose, as it is a non-reducing sugar and is chemically stable. Due to this property, this principal from of carbohydrates does not react with other substances during translocation from leaves to non-photosynthetic organs like roots. The sucrose is transported through sieve elements.



SUCROSE

331. Direction of translocation of organic food or solutes is

(a) upward (b) downward
(c) radial (d) All of these

UP CPMT-2011

Ans. (d): The food material synthesized in the leaves of green plant and from seed during germination is translocated to the growing regions and storage organs of plant. The translocation of organic food is in all direction in the different parts of plant.

332. In hypertonic solution, water potential of cell

(a) increases
(b) decreases
(c) first increases and then decreases
(d) remains unchanged

Uttarakhand PMT-2011

Ans. (b) : When a solution is high concentrated to the other solution such solution is called hypertonic solution.

A hypertonic solution has a higher solute concentrated than another solution and solvent. When the cell placed in hypertonic solution the water potential of the cell decrease due to high conc. of solute.

333. The translocation of organic solutes in sieve tube members is supported by-

(a) Root pressure and transpiration pull.
(b) P-proteins
(c) Mass flow involving a carrier and ATP.
(d) Cytoplasmic streaming.

AIPMT-2006

Ans. (c) : Organic solutes are transported from the source site of production to the sink (utilization site) is a plant by the mass flow process, glucose synthesised in the leaves is converted to sucrose.

- The sucrose is then moved to the sieve tube cells by active transport. This causes an inflow the water from the xylem, thus, increasing the hydrostatic pressure.

The sieve tube develops from the meristematic cells which divides vertically large sieve tube element , initial cells and small companion initial cell.

@apna_pdf

The companion cell may divides transversely or may not divide sieve tube initial enlarge size, at the maturity nucleus completely disintegrate and end walls perforated to form sieve plate and in some dicots proteinaceous slimy discreet bodies form called P_1 protein later on P_2 protein are form, there function is sealing of the pores and transport of the food.

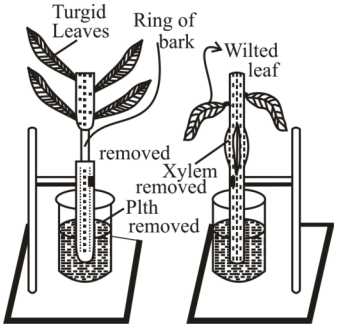
334. Translocation of photosynthetic products in sieve tubes is

(a) 3-5 mm/h (b) 3-5 cm/h
(c) 1-15 cm/h (d) 60-100 cm/h

AIIMS-2011

Ans. (d) : The prepared food materials are transported by phloem. Collateral vascular bundle having only a single patch of phloem but bicollateral vascular bundle having more patch therefore it can transport high amount of the suger. The maximum average rate of translocation of sugers is 100 cm/hour or 1 meter/hour.

335. Identify the process taking place in this experiment.



(a) Ringing experiment for translocation of sap
(b) Demonstration of root pressure
(c) Eosin test to demonstrate ascent of sap
(d) Demonstration of transpiration

AIIMS-2015

Ans. (a) : The vertical movement of water and dissolve substances from root hair to the top of the plants against force of gravity is called the ascent of sap. The different experiments conducted time to time which demonstrated that path of ascent of sap.

Ringing experiment:- In the first step of stem removed not xylem leaf remains turgid.

In second step xylem removed in upper leaves wilting occurs.

It proved that path of ascent of sap is xylem.

The ringing experiment is not applicable in monocot stem.

336. Which is correct about transport of conduction of substances?

(a) Organic food moves up through phloem
(b) Organic food moves up through xylem
(c) Inorganic food moves upwardly and downwardly through xylem
(d) Organic food moves upwardly and downwardly through phloem

AIPMT-1991

Ans. (d) : Correct about transport of conduction of substance is organic food moves upwardly and downwardly through phloem.

Phloem is a complex permanent tissue that helps in the transport of food materials. Phloem is also called bast or laptone. It is a type of vascular tissue. Phloem fibres provide strength and pliability.

Xylem is the vascular tissues that transport H_2O or nutrients from the soil to the stems and leaves.

337. Death of protoplasm is a pre-requisite for a vital function like

(a) transport of sap (b) transport of food
(c) absorption of water (d) gaseous exchange

AIPMT-1989

Ans. (a) : Sap is fluid transported in xylem or phloem cell.

- Sap is distinct from latex, resin, or cell sap.
- Sap is two types - xylem sap is consists of hormones mineral elements and other nutrients and characterized by movement from root towards the leaves.
- Phloem sap consist of sugar, hormone and elements dissolved in H_2O it flow where carbohydrates or produced source to where are use sinks.

338. Phloem conducts food by :

(a) perforated sieve plates
(b) bast fibres
(c) xylem parenchyma
(d) xylem fibres

DUMET-2005

Ans. (a) : In phloem, food is transported through which they have perforated structures at their end walls known as sieve plates.

339. Which of the following required in translocation of food in plants?

(a) Xylem (b) Phloem
(c) Sclerenchyma (d) Collenchyma

DUMET-2003, 2002

Ans. (b) : The movement of food (sugar) through phloem take place in many direction. The phloem is concerned mainly with the transport of soluble organic material made during photosynthesis. This process of transportation of food from source to sink called translocation. Term phloem was used by Carl Nageli.

Collenchyma:- Term collenchyma coined by Schleiden. It is living mechanical tissue not universal found in the herbaceous dicot stem, and absent in the mature or woody dicot stem, monocot stem and root. In dicot stem it forms hypodermis.

Schlerenchyma:- Term used by Mettenius. It is main mechanical and dead mechanical tissue. In monocot stem it form the hypodermis.

340. Translocation of minerals takes place through :

(a) phloem (b) xylem
(c) cambium (d) wood parenchyma

Manipal-2001

Ans. (b) : Translocation in Vascular plants means the movements of Organic molecules and some mineral ions Movement of water and mineral and also provide support and from the soil to the leaves occur in xylem. Term xylem was given by Nageli.

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I. Mass Flow Hypothesis

341. During symport two different molecules move across the membrane

(a) in same direction with the help of same carrier
(b) in opposite direction with the help of same carrier
(c) in same direction with the help of different carriers located at a common site
(d) in same direction with the help of different carriers located at different sites in the same cell

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : The movement of two molecules in same direction is called **symport**.

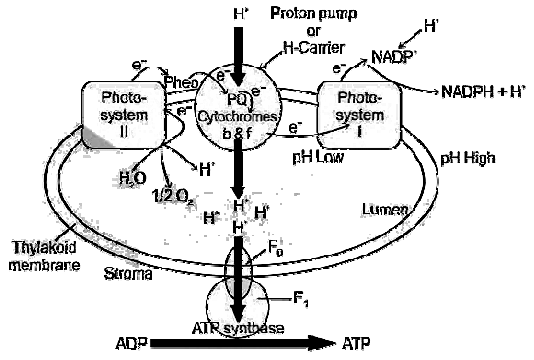
- Movement of two molecules in the opposite direction is called **antiport**.
- When a molecule moves across a membrane independent of other molecule, the process is called **uniport**.

342. Which one of the following is not true regarding the release of energy during ATP synthesis through chemiosmosis? It involves:

(a) Reduction of NADP to $NADPH_2$ on the stroma side of the membrane
(b) Breakdown of proton gradient
(c) Breakdown of electron gradient
(d) Movement of protons across the membrane to the stroma

NEET-2022

Ans. (c) : The actual production of ATP is cellular respiration takes place through the process of chemiosmosis, chemiosmosis involves the pumping of protons through special channels in the membrane to create a gradient or concentration of proton (H^+) within the thyakoid lumen.



ATP synthesis through chemiosmosis (in noncyclic photophosphorylation)

343. In " pressure Flow" hypothesis, sugars are transported from 'source' to 'sink'. The initial steps which occur during this physiological process are shown here.

I. In leaves glucose is converted to sucrose.
II. Sucrose moves from sieve tube cells to companion cells by active transport.
III. Loading of sucrose produces a hypotonic condition in the phloem.
IV. Water in the adjacent xylem moves into phloem by osmosis.

Identify the above correct statements:

(a) I and III (b) II and III
(c) I and IV (d) II and IV

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Pressure flow hypothesis for ascent of sap is the accepted mechanism used for the translocation of sugars from source to sink was given by munch.
As the glucose and fructose is prepared in the leaves by photosynthesis then it is converted to sucrose. So, water in the adjacent xylem moves into the phloem by Osmosis.
Sucrose moves from companion cells to sieve tube by active transport.
Loading of sucrose produces a hypertonic condition in the phloem.

344. Munch hypothesis is based on

(a) Translocation of food due to Turgor Pressure (TP) gradient.
(b) Translocation of food due to imbibition force.
(c) Translocation of food due to TP gradient and imbibition force.
(d) None of these

Karnataka CET-2007

Ans. (a) : The munch's hypothesis is based on the translocation by mass flow from sources to sinks and osmotic mechanism of pressure flow gradient between source organs and sink organs.
Mass flow hypothesis or munch hypothesis is given by German Scientist Ernst munch in 1930.

345. Translocation of organic materials in plants is explained by :

(a) active transport
(b) transpiration pull
(c) inhibition theory
(d) mass flow hypothesis

Punjab MET-2006
AIIMS-1997

Ans. (d) : Mass flow Hypothesis theories have been put forward to explain the mechanism of translocation of organic nutrients through the phloem. Mass flow hypothesis was given by Munch.

346. Which of the following is not correct in mass flow hypothesis?

(a) The sugar is moved bidirectionally.
(b) Loading of the phloem sets up a water potential gradient that facilitates the mass movement in the phloem.
(c) As hydrostatic pressure in the phloem sieve tube increases pressure flow stops and sap is accumulated in phloem.
(d) The sugar which is transported is sucrose.

Karnataka CET-2015

Ans. (c) : The mass flow hypothesis is relation between source and sink. Hydrostatic pressure in the sieve tube of phloem increases, pressure flow begins, and sap moves through phloem. Meanwhile, at the sink, incoming sugars are actively transported out of phloem and removed as complex carbohydrates.

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12 MINERAL NUTRITION

A. Study about the Mineral Requirements of Plants

1. Match the following

List - I (Element)	List-II (Significance)
A. P	I. Stabilizing protein structure
B. S	II. Maintain anion cation balance
C. N	III. Constituent of certain proteins
D. K	IV. Constituent of vitamins

(a) A-III, B-I, C-IV, D-II
(b) A-IV, B-III, C-I, D-II
(c) A-III, B-II, C-I, D-IV
(d) A-III, B-IV, C-II, D-I

TS EAMCET-10.05.2023, Shift-II

Ans. (a) : Sulphur is essential for many growth functions in plants including nitrogen metabolism enzyme activity and protein and oil synthesis.

- **Phosphorus–** It constituent certain protein such as nucleic acid and ATP.
- Nitrogen is an essential nutrient for the production of all proteins and some vitamins.
- K (potassium) main role is body it is help in maintain anion and cation balance.

2. Maximum percentage of which occur in plant ash?

(a) Mg (b) Zn
(c) K (d) Ca

UP CPMT-2006

Ans. (d): The plant ash contains oxides of essential elements like silicon, sodium, calcium, potassium and magnesium.
Much wood ash contains calcium carbonate as its major component, representing 25 or even 45 percent of total ash.
The calcium is involved in organization of spindle and act as enzyme activators.
The deficiency of calcium cause death of meristems found in shoot, leaf, root tips and chlorosis margine of younger leaves.

3. Minerals known to be required in large amounts for plant growth include:-

(a) calcium, magnesium, manganese, copper
(b) potassium, phosphorus, selenium, boron
(c) magnesium, sulphur, iron, zinc
(d) phosphorus, potassium, sulphur, calcium

AIPMT-2015

Ans. (d) : Minerals are those required by plants in quantity of more than 1 milligram/gram or 10 m mole/kg of dry matter called macro element.
Macro element are nine in number- C, H, O, N, P, K, S, Mg, and Ca. Silicon and Sodium occur in some plant in range of macronutrients.

Phosphorus- Phosphorus is a constituent of cell membranes, certain proteins, all nucleic acid and nucleotides, and is required for all phosphorylation reactions.
Potassium- In plant, this is required in more abundant quantities in the meristematic tissues, buds, leaves and root tips.
Sulphur- Sulphur is present in two amino acid- cysteine and methionine and is the main constituent of several coenzymes, vitamins and ferredoxin.
Calcium- Calcium is required by meristmatic and differentiating tissue. It is involved in the normal functioning of the cell membranes.

4. The major portion of the dry weight of plants comprises of: -

(a) Nitrogen, phosphorus and potassium
(b) Calcium, magnesium and sulphur
(c) Carbon, nitrogen and hydrogen
(d) Carbon, hydrogen and oxygen

AIPMT-2003
Rajasthan PMT-2007

Ans. (d): There are three elements are taken by plant in the form of CO_2 and H_2O.
- All living organism contain major elements C, H, O.
- Oxygen is terminal electron acceptor in respiration and Ph is finally governed by hydrogen ion concentration.

5. The technique of growing plants, in water culture, is called

(a) tissue culture (b) aero culture
(c) hydroponics (d) cell culture

Uttarakhand-2005
Punjab MET-1999

Ans. (c) : The technique of growing plants, in water culture, is called hydroponics. This technique was first used and given by Julius Von Sachs. Nutrients are supplied along with the solution without the use of soil.

6. Which of the following element is maximum in plants?

(a) Carbon (b) Zinc
(c) Calcium (d) Magnesium

VMMC-2011 / UP CPMT-2010

Ans. (a) : Plants absorb minerals and nutrients for the growth and development which is known as "mineral Nutrition."
- It is of 2 types → Micronutrients and Macronutrients.
- Macronutrients present in more than 1 milligram/gram or 10 m mole/kg of dry matter called macro element.
  Macro element are nine in number- C, H, O, N, P, K, S, Mg, and Ca. Silicon and Sodium occur in some plant in range of macronutrients among them C is maximum in plant.
- Micronutrients present in less than 1 milligram/gram or 10 m mol/kg of dry matter micronutrients are eight in number - Fe, Mn, Zn, Cu, Mo, B, Cl and Ni.

Hence carbon is maximum in plants.

@apna_pdf

7. The amount of which of the following elements greatest in protoplasm

(a) hydrogen (b) oxygen
(c) nitrogen (d) carbon

CG PMT-2007

Ans. (b) : Oxygen is present abundantly in protoplasm as it constitutes 62% of protoplasm.

Elements	Percentage
Carbon	20%
Hydrogen	10%
Oxygen	62%
Nitrogen	3%

8. Choose the genetically engineered variety of organisms created to deal with the problem of oil leakage

(a) Agrobacterium rhizogenes
(b) Agrobacterium tumefaciens
(c) Escherichia coli
(d) Pseudomonas putida

CMC Ludhiana-2014

Ans. (d) : Genetically variety of organisms created to deal with the problem of oil leakage is pseudomonas putida. It is also known as "superbug" or "oil eating bug." It is genetically engineered by "Prof. Anand Mohan Chakrabarty".

9. This bacteria produces a well known insecticide

(a) B. Thuringiensis (b) B. polymyxa
(c) B. brevis (d) B. licheniformis

BCECE-2009

Ans. (a) : The bacteria which produces an insecticide is bacillus thuringiensis. This bacteria produces a kind of protein which have capacity to kill insects. When an insect ingests the insecticide its remain in inactive form and it is converted to active in alkaline environment form which leads to death.

B. Essential Mineral elements and Criteria of Essentiality

10. Which of the following mineral-nutrients plays an important role in biological nitrogen fixation?

(a) Zinc (b) Iron
(c) Molybdenum (d) Magnesium

DUMET-2009 / Punjab MET-2003
AIPMT-1995 BVP-2006 / JIPMER-2002
BVP-2006 / Rajasthan PMT-2007 /AIPMT-2003

Ans. (c) : An element playing important role in nitrogen fixation is molybdenum. Molybdenum is a component of nitrogenase and nitrate reductase involved during N_2 fixation.

11. The first clinical gene therapy was performed to cure

(a) SCID (b) AIDS
(c) Phenylketonuria (d) Sickle cell anaemia

TS EAMCET 10.05.2023 Shift-I

Ans. (a) : The first clinical gene therapy was performed to cure SCID (Severe Combined Immuno Deficiency). SCID is a type of genetic disorder that affects the body's ability to fight infection. People with SCID are very susceptible to infections and often die in early childhood.

12. Hydroponics was first demonstrated by

(a) Daniel E. Koshland (b) Cornelius Van Niel
(c) Julius Von Sachs (d) T.W. Englemann

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Julius Von Sachs was a German botanist who first demonstrated the technique of hydroponics in 1860. In his experiment he grew bean plants in a nutrient solution and showed that they could grow and flower normally without soil.

13. Match List I with List II

	List I		List II
A.	Iron	I.	Synthesis of auxin
B.	Zinc	II.	Component of nitrate reductase
C.	Boron	III.	Activator of catalase
D.	Molybdenum	IV.	Cell elongation and differentiation

Choose the correct answer from the options given below

(a) A-II, B-IV, C-I, D-III
(b) A-III, B-II, C-I, D-IV
(c) A-II, B-III, C-IV, D-I
(d) A-III, B-I, C-IV, D-II

NEET (UG) 07.05.2023

Ans. (d) : Plants are living organisms and they also require nutrients like us in order to survive, grow, reproduce and development. Macronutrients provide energy to the plants and required in larger amounts to maintain their development and growth.

- Micronutrients are trace elements that help in growth or metabolism.
  Boron- (B) Boron is important for sugar transport, amino acid production, cell wall formation, pollen tube germination, cell elongation and differentiation.
- Iron (Fe)- Iron play a vital role in chlorophyll Production, photosynthesis, lignin formation, Activator of cataloes.
- Zinc (Zn)- Zinc is important to plants for activity of auxins, early growth stage, photosynthesis, etc.
- Molybdenum (Mo) - Molybdenum is component of nitrate reductase.

14. _____element is not required by plants for their normal healthy growth

(a) Phosphorous (b) Potassium
(c) Calcium (d) Lead

AP EAMCET-11.07.2022 Shift-II

Ans. (d) : Lead is not required by plants for their normal healthy growth, because Pb toxicity causes inhibition of ATP production, lipid peroxidation and DNA damage by over production of lead. Lead strongly inhibits seed germination, root elongation, transpiration etc.

15. Match the following:

	List-I		List-II
A	Manganese	i	Kinase reaction and turgidity of cells
B	Magnesium	ii	Water splitting in oxygenic photosynthesis

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C	**Sulphur**	**iii**	**Nitrate reductase**
D	**Molybdenum**	**iv**	**Chlorophyll**
		v	**Disulphide bonds to stabilize the protein structure**

The correct match is:

	(A)	(B)	(C)	(D)
(a)	ii	iv	v	i
(b)	i	ii	iii	v
(c)	iii	i	ii	iv
(d)	ii	iv	v	iii

TS EAMCET-09.05.2019 Shift-I

Ans.(d):

List - I	List-II
(A) Manganese	Water splitting in oxygenic photosynthesis
(B) Magnesium	Chlorophyll
(C) Sulphur	Disulphide bonds to stabilize the protein structure
(D) Molybdenum	Nitrate reductase

16. Consider the following statements i, ii and iii regarding criteria for essentiality of the nutrients in plants:

i. The presence of elements is must for plants to complete their life cycle.

ii. The role of the element can be replaced by another element.

iii. The element must be directly involved in the metabolism of the plant.

Choose the correct statements:

(a) i and ii (b) ii and iii

(c) i and iii (d) iii only

Karnataka CET-2019

Ans. (c) : The presence of elements is essential for plants to complete their life cycle and the elements are directly involved in the metabolism of the plant. The role of the element can be replaced by another element is not true regarding the criteria for essentiality of the nutrients in plants.

Hence, statements I and III are correct only.

17. Which option is correct for the correctly matched pairs of the following mineral ions and their importance?

Mineral ions		Importance	
(i)	**Chlorine**	**(p)**	**For germination of pollen grain**
(ii)	**Boron**	**(q)**	**For synthesis of nucleic acid**
(iii)	**Zinc**	**(r)**	**For cell-division**
(iv)	**Magnesium**	**(s)**	**For the synthesis of Auxin**

(a) (i – r) (ii – p) (iii – s) (iv – q)

(b) (i – r) (ii – q) (iii – s) (iv – p)

(c) (i – q) (ii –s) (iii – r) (iv – p)

(d) (i – s) (ii – r) (iii – q) (iv – p)

GUJCET-2019

Ans. (a) : Chlorine– Cl^- determines increased fresh and dry biomass, greater leaf expansion, increased elongation of leaf and root cell (cell-division), improved water relation, higher mesophyll diffusion to Co_2, and better water-and Nitrogen-metabolism.

Boron– Boron plays an important role in regulating plants hormone level and promoting proper growth. Boron increases power production and retention, pollen tube elongation and germination and seed and fruit development.

Zinc– Zinc is essential element for auxin biosynthesis. Zinc play role in protein synthesis and also acts as enzyme activator and deficiency causes shortening of internodes.

Magnesium– Magnesium is an essential element for the synthesis and salvage of purine and pyrimidine nucleotides. It plays an important role in the structure of nucleic acid and affects their interaction with proteins and other ligands.

18. Match the following :

List-I	List-II
(A) Manganese	**(i) It activates carboxylases**
(B) Magnesium	**(ii) Splits water to liberate oxygen**
(C) Zinc	**(iii) Involved in the synthesis of DNA and RNA**
(D) Nickel	**(iv) Activator for urease enzyme**
	(v) Helps in stabilizing the protein structure

The correct answer is

	A	B	C	D
(a)	(iii)	(iv)	(ii)	(i)
(b)	(iv)	(i)	(v)	(iii)
(c)	(i)	(ii)	(v)	(iv)
(d)	(ii)	(iii)	(i)	(iv)

TS EAMCET-02.05.2018 Shift-II

Ans. (d) :

List – I		List - II
a.	Manganese	Splits water to liberate oxygen
b.	Magnesium	Involved in the synthesis of DNA and RNA
c.	Zinc	It activates carboxylase
d.	Nickel	Activator for urease enzyme

19. Which one of the following elements is activator for both ribulose bisphosphate, carboxylase oxygenase and phosphoenolpyruvate carboxylase in photosynthetic carbon fixation ?

(a) Mg^{2+} (b) Zn^{2+}

(c) Mn^{2+} (d) Cl^- and K^+

JIPMER-2016

Ans. (a) : Ribulose bisphosphate, carboxylase oxygenase and phosphoenol pyruvate carboxylase are critical enzymes in photosynthetic carbon fixation Mg^{2+} ion is activator for Ribulose bisphosphate and carboxylase oxygenase enzymes.

20. A plant requires magnesium for:

(a) Cell wall development

(b) Holding cells together

@apna_pdf

(c) Protein synthesis
(d) Chlorophyll synthesis

AIPMT-2007

Ans. (d) : One atom of magnesium is directly coordinated to the four pyrrole rings in the cyclic tetrapyrrole head. Thus mg^{2+} is the most important structural component of chlorophyll molecules.

21. An essential mineral nutrient of plant, responsible for meristematic activity, metabolism of fat, lipid, hormone and nitrogen also facilitate translocation of photosynthetic product, i.e., organic food, that essential element is
(a) Mo (b) Boron
(c) Cu (d) Zn

UP CPMT-2014

Ans. (b): An essential mineral nutrient of plant, responsible for meristematic activity, metabolism of fat, lipid, hormone and nitrogen also facilitate translocation of photosynthetic product, i.e., organic food, that essential element is Boron.

22. Plastocyanin contains
(a) copper (b) iron
(c) calcium (d) potassium

UP CPMT-2011

Ans. (a): Plastocyanin is a copper-containing protein that mediates electron-transfer where it participates in photosynthesis. It is a prototype of blue copper proteins which is a family of intensely blue-colored metallo proteins.

23. Which ion help in opening and closing of stomata?
(a) Mn^{+} (b) Mg^{2+}
(c) Ca^{2+} (d) K^{+}

UP CPMT-2011

Ans. (d): K^{+} plays an important role in the opening and closing of stomata. As per K^{+} theory, the movement of K^{+} ions across the cell membranes of the guard cell of the stomata leads to changes in the osmotic pressure of the surrounding cells.

24. An element playing important role in nitrogen fixation is:
(a) Molybdenum (b) Copper
(c) Manganese (d) Zinc

AIPMT (Screening)-2010

Ans. (a) : Molybdenum plays an important role in N_2 fixation.
The enzyme complex nitrogen consists of two protein dinitrogenase reductase (component 1) that binds N_2 and a smaller iron protein (component 2) that acts as electron donor to MO-Fe Protein.

25. An essential element is that which
(a) is found in plant ash.
(b) is available in the soil.
(c) improve health of the plant.
(d) is irreplaceable and indispensable for growth of plants.

Karnataka CET-2007

Ans. (d) : An essential element is that which is irreplaceable and mandatory for growth of plants. They help in normal growth and reproduction of plants and also play vital role in life cycle and setting the seeds. Some essential elements are such as C, H, Ca, N, P, K, Ca, Mg, Fe, Cu, Zn, etc.

26. Plants take zinc in form of:
(a) $ZnSO_4$ (b) Zn^{++}
(c) ZnO (d) Zn

AIPMT-2000

Ans. (b) : Plants take zinc in form of Zn++. It helps in growth and development of plants. The primary function of zinc is to help the plant to produce chlorophyll.

27. When the plants are grown in magnesium deficient but urea rich soil; the symptoms expressed are:
(a) Yellowish leaves (b) Colourless petiole
(c) Dark green leaves (d) Shoot apex die

AIPMT-2000

Ans. (a) : When the plants are grown in magnesium deficient but urea rich soil; the symptoms expressed are yellowish leaves.

28. Best defined function of Manganese in green plants is:
(a) Nitrogen fixation (b) Water absorption
(c) Photolysis of water (d) Calvin cycle

AIPMT (Screening)-2012

Ans. (c) : Manganese (Mn^{2+}) is used for photolysis of water to produce Oxygen and electrons during light reaction of photosynthesis in chloroplast.
Mn catalyses the photosynthesis process by splitting of water after photosystem-II fixes light to initiate the conversion of CO_2 and water into carbohydrates.

29. Which of the following elements is a constituent of biotin?
(a) Sulphur (b) Magnesium
(c) Calcium (d) Phosphorus

NEET (Karnataka)-2013

Ans. (a) : Sulphur is present in two amino acid- cystein and methionine. It is the main constituent of several coenzyme, vitamins (thiamins, biotin, coenzyme A) and ferredoxin.
Plants obtain sulphur in the form of sulphate $\left(SO_4^{2-}\right)$.

30. Study the following lists.

List I	List II
(A) Sulphur	(i) Cytochrome-c oxidase
(B) Molybdenum	(ii) IAA synthesis
(C) Copper	(iii) Biotin
(D) Manganese	(iv) Dinitrogenase
	(v) Oxygen evolving complex

The correct match is :

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	1	2
(c)	3	4	1	5
(d)	4	1	2	5

AP EAMCET-2010

Ans. (c) :

List-I	List-II
(A) Sulphur	Biotin
(B) Molybdenum	Dinitrogenase
(C) Copper	Cytochrome-C-Oxidase
(D) Manganese	Oxygen evolving Complex

@apna_pdf

31. Molybdenum is the essential constituent of
(a) nitrogenase (b) respiratory chain
(c) growth regulators (d) chlorophyll
AP EAMCET-2011

Ans. (a): Molybdenum is an essntial component in two enzymes that convert nitrate into nitrite and then into ammonia. It also needed by symbiotic nitrogen fixing bacteria in leagumes to fix atmospheric nitrogen.

32. Plants require one of these for the formation of ATP :
(a) N, Ca (b) N, P
(c) N, Cu (d) K
BHU PMT (Screening)-2007
AFMC-2000

Ans. (b) : Plants require Nitrogen and Phosphorus for the formation of ATP. Phosphorus is an energy carrier and forms part of ATP, NADP and ADP.
Plants absorb phosphorus in the form of phosphate.

33. Which of the following elements are used up in phosphorylation?
(a) N and P (b) I and P
(c) Ca and Mg (d) Ca and S
BCECE-2011

Ans. (a) : Elements used in phosphorylation are Nitrogen and Phosphorus.
Phosphorus is a constituent of cell membranes, certain proteins, all nucleic acids and nucleotides, and is required for all phosphorylation reactions.

34. The number of essential nutrients needed in plants is:
(a) 16 (b) 5
(c) 4 (d) 8
Haryana PMT-2005
BHU PMT-2003
AP EAPCET-11.07.2022 Shift-I

Ans. (a) : Essential nutrients in plants are of 16 in number, which is divided into 2 types :
Macronutrients : C, H, O, N, P, K, Mg, Ca, S
Micronutrients : B, Zn, Mn, Cu, Mo, $C\ell$, Fe etc

35. Which of the following is not trace element?
(a) Mg (b) Zn
(c) B (d) Cu
Rajasthan PMT-1996

Ans. (a) : Micronutrients are also known as "trace elements". Trace elements are required by plants in small quantities (> less than 1 ppm).
Example- B, Zn, Cu, Mo, Mn, Cl, Fe, Ni, etc.
Hence, Mg is a macronutrient so, it is not trace element.

36. Fertilizers providing N,P, K all essential elements to plants are called :
(a) complete fertilizers
(b) incomplete fertilizers
(c) manure
(d) compost
BHU PMT-2001

Ans. (a) : Nitrogen, Phosphorus and Potassium are called " complete fertilizers", as they are primary or macronutrients of the plant.
As these elements (N, P, K) are beneficial for plants growth and development.

37. Which one of the following elements is almost non-essential for plants?
(a) Ca (b) Mo (c) Zn (d) Na
JIPMER-2003 /AIPMT-1996

Ans. (d) : Sodium is almost non-essential for plant because it does not comes under the criteria of plant nutrient, as plants can also complete their life cycle without sodium.

38. Which of the following is a component of middle lamella in plant cells ?
(a) Fe (b) K (c) Ca (d) Cu
BHU PMT (Screening)-2010
JIPMER-2000 / Haryana PMT-1999

Ans. (c) : Calcium is found in middle lamella of a plant in the form of "Calcium pectate".
Calcium acts as a cementing material between two different cells wall. It also stimulates root hair development in plants.

39. The essential element needed for water splitting in photosynthesis leading to O_2 evolution is
(a) Mo (b) Mn
(c) Mg (d) K
AMU-2012

Ans. (b) : Manganese activate many enzymes involved in photosynthesis, respiration and nitrogen metabolism. The best defined function of manganese is the splitting of water to liberate oxygen during photosynthesis.
It is absorbed in the form of manganous ion (Mn^{2+})

40. For chlorophyll formation most important elements are
(a) iron and Ca (b) iron and Mg
(c) Mg and Ca (d) iron and Na
Haryana PMT-2011 / CG PMT-2006

Ans. (b) : Iron and Magnesium are essential for formation of chlorophyll. Mg is present in tetrapyrrole ring of chlorophyll. Mg forms integral component of chlorophyll.
Iron maintains structural integrity of chloroplast (where chlorophyll is present).
Iron is an important constituent of proteins involved in the transfer of electrons like ferredoxin and cytochromes.

C. Deficiency Symptoms of Essential Element

41. Insectivorous plant grow generally in soil that are deficient in
(a) water (b) nitrogen
(c) potassium (d) calcium
Manipal-2002,2012 / CG PMT-2009
Haryana PMT-2009, 1999 / CMC Ludhiana-2008
BCECE-2007, 2006 / AMU-2001,2004,2006,2009
VMMC-2004,2005 / UP CPMT-2001
Punjab MET-2004,2008 / BVP-2001, 2003
KVPY SB and SX-2016 / JIPMER-2002,2006
BHU PMT (Screening)-2006 / AIPMT-1999

Ans. (b) : Insectivorous plant grow generally in soil that are deficient in nitrogen because they trap and digest insects to suck up nutrient. For example- Venusflytrap, pitcher plant etc. are a number of insectivorous plants. They are often called carnivorous plants.

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42. Die back of citrus and reclamation of legumes and cereals is due to deficiency of :

(a) copper (b) zinc
(c) sodium (d) Molybdenum

AFMC -2011 / AMU-2015
MHT CET-2019 / WB JEE-2015 / Punjab MET-2011

Ans. (a) : Deficiency of copper in plants leads to "Die Back disease" in which necrotic lesions develops near leaf tip.

- In cereals and legumes, Cu deficiency causes "Reclamation disease" in which leaf tightly rolled and apical buds die.
- Deficiency of Cu, also causes "Exanthema disease" in which bark splits up at places to exude gum, resins.

43. Toxicity of which micronutrient induces deficiency of iron, magnesium and calcium?

(a) Boron (b) Zinc
(c) Molybdenum (d) Manganese

Karnataka CET-20.05.2023

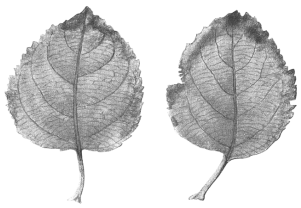
Ans. (d) : Manganese toxicity can induce deficiency of iron, magnesium and calcium because it completes with these micronutrients for uptake by the plants. Manganese can also inhibit the enzymes that are involved in the absorption and utilization of iron, magnesium and calcium.

44. Deficiency symptoms of nitrogen and potassium are visible first in:

(a) Sensecent leaves (b) Young leaves
(c) Roots (d) Buds

AIPMT-2014

Ans. (a) : The elements that are actively mobilised within the plants that show the deficiency lead to the death of the plant. The defincicney of potassium in plants in first visisble in the old leaves because they are mobile elements. similarly Nitrogen is mobile elements and its deficiency first visible is old leaves (senseecent leaves).



45. Plants deficient of element zinc, shows its effect on the biosynthesis of plant growth hormone –

(a) Auxin (b) Cytokinin
(c) Ethylene (d) Abscissic acid

AIPMT-2003

Ans. (a): Plants require zinc for the synthesis of tryptophan, a key amino acid in the synthesis of the Auxin indoleacetic acid (IAA). Therefore, zinc also operates in the control of plant development through its indirect action on auxins.

46. Internal cork disease in apple is due to the deficiency of

(a) iron (b) copper
(c) boron (d) phosphorus

Uttarakhand PMT-2007
BVP-2008

Ans. (c) : "Internal cork Disease" in apple is due to deficiency of Boron. It forms lesions in internal fleshy part and affects the quality of fruit.
Round marks appear on flesh, spots dry up and colour turns darker from centre to outward.
Symptoms are seen within 6 - 8 weeks.

47. The deficiency of this micro-nutrient results in little leaf disease

(a) Copper (b) Zinc
(c) Boron (d) Iron

Haryana PMT-2011
JandK CET-2008

Ans. (b) : Deficiency of Zinc, causes "little leaf" disease.
It also "Suppresses seed formation".
Symptons includes – plants become dwarf, leaves become mottled and yellowish in colour.

48. Molybdenum causes

(a) Mottling (b) Wilting
(c) Reclamation (d) Chloros is

BHU PMT (Screening)-2007

Ans. (a) : Molybdenum causes mottling, plants become stunted, leaves turn yellow in colour in legumes.
Its deficiency leads to "whiptail Disease" in cabbage.
Symptoms includes interveinal chlorosis, Nitrate reduction suppressed.

49. Match the Column I with that of Column II and choose the correct combination from the options given.

Column-I Essential elements		Column II Deficiency causes	
p.	**N, K, Mg, S, Fe, Mn, Zn, and Mo**	**1.**	**Inhibit cell division**
q.	**N, K, S and Mo**	**2.**	**Necrosis**
r.	**Ca, Mg, Cu and K**	**3.**	**Delay in flowering**
s.	**N, S and Mo**	**4.**	**Chlorosis**

(a) (p) - (4), (q) - (3), (r) - (2), (s) - (1)
(b) (p) - (1), (q) - (2), (r) - (3), (s) - (4)
(c) (p) - (4), (q) - (1), (r) - (2), (s) - (3)
(d) (p) - (2), (q) - (3), (r) - (4), (s) - (1)
(e) (p) - (3), (q) - (4), (r) - (2), (s) - (1)

Kerala PMT-2015

Ans. (c) : Essential Elements	Deficiency
(i) N, K, Mg, S, Fe, Mn, Zn, Mo	Chlorosis
(ii) N, K, S and Mo	Inhibit cell division
(iii) Ca, Mg, Cu, K	Necrosis
(iv) N, S, Mo	Delay in flowering

50. Chlorosis is produced in leaves due to deficiency of Fe, Mg, Mn, N or S. of these essential element those that are exclusive constituents of chlorophyll molecules are

(a) Fe and S (b) N and S
(c) Mg and S (d) Mg and N

JIPMER-2015
AMU-1998

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Ans. (d) : Chlorophyll contains Mg and N. The general formula of chlorophyll is $C_{55}H_{72}O_5N_4Mg$.
Chlorosis is a condition in which leaves produce insufficient chlorophyll. i.e. pale yellow. Chlorosis is caused by deficiency of Iron, magnesium, Zinc, Manganese, Nitrogen, Sulphur.

51. Grey spots of oat are caused by deficiency of
(a) Cu (b) Zn
(c) Mn (d) Fe
AMU-2007 / CG PMT-2007

Ans. (c) : Grey spots of Oats are caused by deficiency of Manganese (Mn). Mn produces a condition known as "Grey speck" with patches. Oats becomes pale green and young leaves have spots of grey or brown necrotic tissue with orange margins.

52. Motile leaf in citrus plants is due to deficiency
(a) boron (b) magnesium
(c) zinc (d) None of these
CG PMT-2007

Ans. (c) : Motile leaf in citrus plants is due to deficiency of Zinc (Zn).
Zn deficiency causes chlorosis (absence of chlorophyll). i.e. yellowing of leaves.

53. For good growth of pollen tube, necessary element is
(a) Ca (b) B
(c) Mg (d) Mo
Haryana PMT-2009 / CG PMT-2009

Ans. (b) : Boron is required for uptake and utilization of Ca^{2+}, and proper membrane functioning, pollen germination, cell elongation, cell differentiation and carbohydrate translocation.

54. The plants growing in magnesium-deficient soil, but sprayed with urea would show
(a) deep green foliage
(b) loss of pigments in petals
(c) early flowering
(d) yellowing of leaves
Haryana PMT-2010

Ans. (d) : Magnesium deficiency leads to "Interveinal chlorosis" of leaves results in defoliation due to break down of chlorophyll. It characterized by yellowing of leaf veins and early leaf fall. It is still yellow in colour because urea does not contains Mg. Urea comprises mixture of Ammonium Nitrate and lime.
Hence, plants show yellowing of leaves.
Epsom salts (magnesium sulfate) dissolved in water, sprayed on leaves will cure its deficiency.

55. Which of the following is not caused by deficiency of mineral?
(a) Chlorosis (b) Etiolation
(c) Shortening of internodes (d) Necrosis
JIPMER-2008 / AIPMT-1997 / Haryana PMT-2008

Ans. (b) : Deficiency of Minerals leads to chlorosis, shortening of internodes, Necrosis respectively due to the lack of Fe, K and N, S, Mo. .
- But etiolation is a process in which plants grown in partial or complete absence of light.
- Etiolation is characterized by weak stems, smaller leaves, longer internodes, pale yellow colour. Development of seeding in dark is known as "Skotomorphogenesis" and leads to etiolated seedling.
- Simply etiolation means growth of plants in absence of sunlight.

56. Yellowish edges appear in leaves deficient in
(a) Ca^{++} (b) Mg^{++}
(c) K^+ (d) Sulphur
AMU-2008 / VMMC-2008

Ans. (c) : Potassium is abundant in young parts of plants eg. Buds, root tips and shoot tips. It help in maintaining anion-cation balance and turgidity in cells.
- Potassium helps in control of respiration, closing an opening of stomata.
- Symptoms includes, dead tissue at tips, between veins, margins of leaves, plants are more prone to disease due to potassium deficiency in plants.

57. Mottled chlorosis on the leaves occurs due to the deficiency of
(a) Nitrogen (b) Phosphorus
(c) Potassium (d) Sulphur
JandK CET-2007

Ans. (c) : Mottled chlorosis refers to yellowing and curling of leaves, loss of apical dominance etc.
- It is due to potassium deficiency.
- Foliage leaves suffers first and tips become scorched and margins become dull yellow in colour.
- Deficiency shows decrease in protein synthesis failure of cells to divide which become elongated.

58. Browning of cauliflower is a
(a) fungal disease (b) bacterial disease
(c) physiological disease (d) viral disease
CG PMT-2011

Ans. (c) : Browning of Cauliflower is a physiological disease.
- It is caused due to deficiency of Boron.
- Symptoms of Boron deficient plants are – water soaked regions appear on the stem and curd.
- Stem becomes hollow as plant grows and soaking water tissue covers inner walls of cavity.

59. White -bud condition in maize is produced due to the deficiency of
(a) iron (b) molybdenum
(c) zinc (d) boron
CG PMT-2011

Ans. (c) : White bud condition in maize is due to deficiency of Zinc [Zn] in plants.
- Zn is a trace element i.e. required in low amount Symptoms include chlorotic pale, yellow midrib from base of the leaves.
- Younger leaves totally becomes yellowish in colour i.e. chlorosis occurs.
- Internode growth reduced and leads to stunted plant growth.

60. Tea yellow is a disease of tea plants produced due to the deficiency of
(a) phosphorus (b) sulphur
(c) potassium (d) nitrogen
CG PMT-2011

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Ans. (b) : Tea yellow is a disease of tea plants produced due to deficiency of sulphur.

- It is characterised by progressive degradation of tree, leaves become yellowish in colour i.e. chlorosis in leaf (absence of chlorophyll)
- Small, rolling of leaf and finally abscise [shedding off).
- Yellow tea Disease is also known as foria foot disease of tea.

61. Chlorosis in leaf occurs due to the deficiency of:

(a) Chloride (b) Magnesium
(c) Phosphate (d) Molybdenum

Rajasthan PMT-2006, 2000
JCECE-2007 / JandK CET-2010

Ans. (b) : Chlorosis means a state where leaves are unable to produce sufficient chlorophyll due to deficiency of iron, Magnesium, Zinc, Manganese, Nitrogen and Sulphur.

- Magnesium plays an important role in formation of chlorophyll as it is present in tetrapyrrolic ring of chlorophyll.
- Formula of chlorophyll is $C_{55}H_{72}O_5N_4$ Mg.

62. Assertion: Deficiency of sulphur causes chlorosis in plants.
Reason: Sulphur is a constituent of chlorophyll, proteins and nucleic acids.

(a) If both assertion and reason are true and reason is the correct explanation of assertion
(b) If both assertion and reason are true but reason is not the correct explanation of assertion
(c) If assertion is true but reason is false
(d) If both assertion and reason are false

VMMC-2005

Ans. (c) : Deficiency of sulphur leads to chlorosis in plants i.e. insufficient/chlorophyll is not formed in plants.

- Sulphur is absorbed as sulphate ions and it is a component of protoplasm.
- Sulphur is essential for formation of vitamins and coenzymes
- Sulphur is essential for root formation and its deficiency leads to retardation of cell division and stops formation of fruits in plants.
- Hence, it is not a direct component of chlorophyll out indirectly affects the growth of a plant.

63. Opening and closing of stomata is due to

(a) Ca^{2+} (b) Na^{+}
(c) K^{+} (d) Cl^{-}

BCECE-2008

Ans. (c) : Opening and closing of stomata is due to potassium (K^{+}).

- It plays an important role in osmotic regulation and hydration.
- Potassium is main component of active transport mechanism of stomatal closing and opening.
- Potassium regulates the opening and closing of plant stomata. Stomates are the pores on plant leaves that allow for gas and water vapor exchange. When the plants have adequate potassium, the guard cells swell and allow for complete closure of the stoma opening.

D. Macro and Micronutrient and its Function

64. Which elements are essential for photolysis of water during photosynthesis process?

(a) Mn and Mg (b) Mn and Cl
(c) Mg and Ca (d) P and Mg

VMMC-2014 / AMU-2005 / Uttarakhand PMT-2004
BVP-2006 / CG PMT-2004/ AIPMT (Re-Exam)-2015

Ans. (b) : Photolysis occurs in the granum of a chloroplast where light reabsorbed by chlorophyll. Photolysis is the process by which water is split into oxygen, which is released into the atmosphere and hydrogen.

- Mineral ions required for photolysis of water are manganese, calcium and chlorine. From this process, the oxygen released as a by product while the reduced hydrogen acceptor makes its way to the second stage of photosynthesis and chlorine cycle.

65. Which of the following is are not an essential micro nutrient ?

(a) Boron (b) Nickel and cadmium
(c) Molybdenum (d) Zinc

HP CET-2011 / VMMC-2005
AMU-2004 / BVP-2003

Ans. (b) : Nickel and Cadmium is not on essential micronutrient.

- All the elements are classified as follows –

Micronutrients	Macronutrients
Boron	Carbon
Zinc	Hydrogen
Manganese	Oxygen
Copper	Nitrogen
Molybdenum	Phosphorus
Chlorine	Potassium
Iron	Magnesium, Sulphur, Calciums

66. Deficiency of the following causes Necrosis or death of leaf tissue

(a) N, K, S, Mo (b) N, S, Mo, Ca
(c) Ca, Mg, Cu, K (d) Mg, S, Mn, Zn

AP EAPCET-22.05.2023, Shift-II

Ans. (c) : Necrosis or death of leaf tissue is caused by the deficiency of certain elements like Ca, Mg, Cu and K. These elements are involved in many important plant functions, including cell structure, photosynthesis and water transport.

67. Which of the following mineral ion is not remobilized in plants?

(a) Nitrogen (b) Phosphorus
(c) Potassium (d) Calcium

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : Calcium is the elements in plants which is not mobilized because it is a structural component.

- Calcium is associated with the cell plate in plants.
- Phosphorus, nitrogen and potassium are the elements that are most easily mobilized.

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68. Match List-I with List-II

	List-I		List-II
(A)	Manganese	(i)	Activates the enzyme catalase
(B)	Magnesium	(ii)	Required for pollen germination
(C)	Boron	(iii)	Activates enzymes of respiration
(D)	Iron	(iv)	Functions in splitting of water during photosynthesis

Choose the correct answer from the options given below :

(a) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)
(b) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(c) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)
(d) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)

NEET-2022

Ans. (c) : Manganese - Manganese is a micronutrient for plants, it is required for functioning of many enzymes of respiration photosynthesis and nitrogen metabolism.

e.g- splitting of water during photosynthesis required manganese

- **Magnesium** - It helps in the activation of enzymes involved in photosynthesis and respiration.

→ It is involved in the synthesis of DNA and RNA.
→ It is constituent of the structure of chlorophyll.
→ It helps in maintaining the ribosome structure.

- **Boron** - Boron is one of the essential nutrients for the optimum growth development yield and quality of crop. It performs many important functions in plants and is mainly involved in cell wall synthesis and structural integration also required for pollen germination.
- **Iron** - Iron is also required for photosynthesis and chlorophyll synthesis and also activates the enzyme catalase.

69. Which one of the following elements is an essential micronutrient for plants ?

(a) Nitrogen (b) Potassium
(c) Calcium (d) Boron

Tripura JEE-2021

Ans. (d) : Boron is an essential micronutrient for plants and C, H, O, N, P, K, Ca, Mg, S are macronutrients.

- Boron absorbed by plants in the form of borate or tetraborate ions.
- It is decreases with increase in pH.
- B is necessary for meristematic activity and for nodule formation in leguminous plants.
- It facilitates translocation of sugars in plants.
- Also helpful in salt absorption, photosynthesis and hormone regulation, flowering and fruiting.

70. Lack low levels of Potassium, Nitrogen, Sulphur an Molybdenum causes_____

(a) Chlorosis
(b) Necrosis
(c) Premature leaf fall
(d) Inhibition of cell division

AP EAMCET-24.09.2020 Shift-I

Ans. (a): Chlorosis or loss of chlorophyll leads to the yellowing of leaves. It is caused by the deficiencies of nitrogen, Potassium, magnesium, sulphur, iron, Manganese, zinc and Molybdenum.

Premature leaf fall is due to deficiency of phosphorus. Necrosis is due to deficiency of Mg, Ca, Cu, K. Inhibition of cell division is due to deficiency of N, S, Mo.

71. Match the following concerning essential elements and their functions in plants

(A)	**Iron**	**(i)**	**Photolysis of water**
(B)	**Zinc**	**(ii)**	**Pollen germination**
(C)	**Boron**	**(iii)**	**Required for chlorophyll biosynthesis**
(D)	**Manganese**	**(iv)**	**IAA biosynthesis**

Select the correct option

	(A)	(B)	(C)	(D)
(a)	(iv)	(iii)	(ii)	(i)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iv)	(i)	(ii)	(iii)
(d)	(ii)	(i)	(iv)	(iii)

NEET-2020 Phase-I

Ans. (b) :

Iron- It activates catalase enzyme and is essential for the formation of chlorophyll.

Zinc- It activates carboxylase enzyme and also needed in the synthesis of Auxin (IAA).

Boron- It is required for uptake and utilization of Ca^{2+}, membrane functioning, pollen germination, cell elongation, cell differentiation and carbohydrate translocation.

Manganese- The best defined function of Mn is in the splitting of water to liberate O_2 during photosynthesis.

72. Study the following lists concerning the deficiency diseases and role of elements

	List -I		List - II
(A)	**Die-back in citrus**	**(I)**	**Urease**
(B)	**Mottled leaf**	**(II)**	**Hexokinase**
(C)	**Mouse ear in pecan**	**(III)**	**Nitrogenase**
(D)	**Whip tail in cauliflower**	**(IV)**	**Cytochrome 'C' oxidize**
		(V)	**Carboxypeptidase**

	(A)	(B)	(C)	(D)
(a)	(V)	(III)	(II)	(IV)
(b)	(III)	(II)	(IV)	(I)
(c)	(IV)	(V)	(I)	(III)
(d)	(IV)	(I)	(III)	(V)

AP EAMCET-2014
AP EAMCET-25.09.2020 Shift-II

Ans. (c) : After read the following table option (c) is the correct answer.

List-I		List-II		Element
(A)	Die-back in citrus	(IV)	Cytochrome 'C' oxidize	Cu
(B)	Mottled leaf	(V)	Carboxypeptidase	Zn
(C)	Mouse ear in pecan	(I)	Urease	Ni
(D)	Whip tail in cauliflower	(III)	Nitrogenase	Mo

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73. Which of the following is a group of micronutrients for plants?

(a) Fe, Mn, Cu, Mo, Zn (b) Fe, Mn, Cu, O, C
(c) Cu, B, Cl, Fe, Ca (d) Ca, Mg, Fe

AIIMS-2016 / AIIMS-2007
AIIMS-25.05.2019 Shift-II

Ans. (a)

Micronutrients	Macronutrients
• micronutrients are required in small quantities.	• Macronutrient are required in large amount.
• They are present in low concentration in plant.	• They are present in excessive concentration in plant.
• Also called Trace elements.	• Also called major elements.
like– Fe, Mn, Cu, Zn, Mo, B, Cl and Ni.	**like–** C, H, N, O, P, K, Ca, S and Mg.

74. Which of the following is microelement?

(a) Ca (b) Mg
(c) Mn (d) S

AIIMS-25.05.2019 Shift-I

Ans. (c) : Micronutrients or trace element are needed in very small amounts (less than 10m mole Kg^{-1} of dry matter). They are- Fe, Mn, Mo, Ni, Zn, B, Cl, Cu

• Manganese (Mn) is an important micronutrient for plant growth and development and sustains metabolic roles within different plant cell compartments. The metal is an essential cofactor for the oxygen-evolving complex (OEC) of the photosynthetic machinery, catalyzing the water-splitting reaction in photosystem II(PS II).

75. Which of the following is correct set of macronutrients?

(a) K, B, C, H (b) K, H, Mn, N
(c) C, Zn, H, N (d) C, H, Mg, N

AIIMS-25.05.2019 Shift-I

Ans. (d) : Carbohydrates, fat and protein are called macronutrients. They are the nutrients you use in the largest amounts. Macronutrients are the cornerstones of your diet. Macronutrients are the nutritive components of food that body needs for energy and to maintain the body's structure and systems.

• The macronutrients include carbon (C), Hydrogen (H), Oxygen (O) , Nitrogen (N), Phosphorous (P), Sulphur (S), Potassium (K), Calcium (Ca) and Magnesium (Mg).

76. Which of the following is not a micronutrient?

(a) B (b) Zn
(c) Mn (d) Mg

JIPMER-2019
AIPMT (Screening)-2010

Ans. (d) : • Mg in not a micronutrient

• Micronutrients are essential elements required by organism in varying quantities throughout life to carry a range of physiological functions to maintain health.

Micronutrients - Boron (B), Zinc(Zn), Manganese (Mn), iron(Fe), Copper(Cu), Molybdenum(Mo), Chlorine(Cl), Nikel (Ni).

Macronutrients - Magnesium(Mg), Calcium(Ca) Potassium(K), Sulphur(S), Phosphorus(P), Nitrogen(N), Carbon(C), Hydrogen(H), Oxygen(O), So, Magnesium come under Macronutrient.

77. Match the following

	List-I		List-II
(p)	**Chlorine**	**(i)**	**Helps to maintain an anion-cation balance and is involved in protein synthesis.**
(q)	**Sulphur**	**(ii)**	**Helps in determining the solute concentration**
(r)	**Potassium**	**(iii)**	**It is the main constituent of several coenzymes and vitamins.**
(s)	**Nickel**	**(iv)**	**Found to induce disease resistance in some plants.**
		(v)	**Structural component of Cytochrome 'C' oxidase.**

	(p)	(q)	(r)	(s)
(a)	(iv)	(ii)	(iii)	(v)
(b)	(ii)	(iii)	(i)	(iv)
(c)	(i)	(iv)	(ii)	(iii)
(d)	(ii)	(v)	(iii)	(iv)

TS EAMCET-02.05.2018 Shift-I

Ans. (b) :

- Chlorine-Helps in determining the solute concentrate ion.
- Sulphur-It is the main constituent of several coenzyme and vitamins
- Potassium-Helps to maintain anion-cation balance and is involved in protein synthesis
- Nickel-Found to induce disease resistance in some plants.

78. Select the incorrect statement:

(a) Microelements involve N, P, Mn, Cu, Mo.
(b) The concentration of microelements is 10 m mole/kg.
(c) If the concentration is more than 10 m mole/kg. They becomes toxic.
(d) The deficiency of microelements causes symptoms of disease

AIIMS-27.05.2018 Shift-II

Ans. (a) : Macronutrients are generally present in plant tissue in large amount (in excess of 10m mole kg^{-1} of dry matter). They are- C, O, H, N, P, S, K, Mg, Ca

• Microelements or trace elements are needed in very small amounts (less than 10m mole kg^{-1} of dry matter) for the healthy development of plant. These include- Fe, Mn, Mo, Ni, Zn, B, Cl, Cu

Hence, Mg, is a macronutrients not a micronutrient.

79. In which of the following forms is iron absorbed by plants?

(a) Ferric (b) Ferrous
(c) Both ferric and ferrous (d) Free element

NEET-2018

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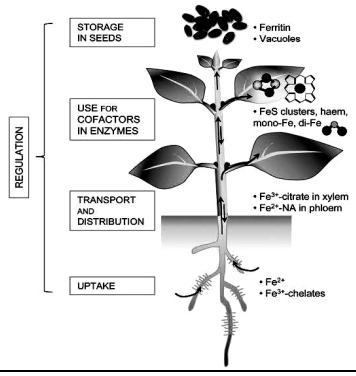
Ans. (a) : It is absorbed in the form of ferric ions (Fe^{3+}) and as opposed to other micronutrients, it is needed in larger quantities.

- It is often used in redox reactions due to presence of two oxidation states.
- It also serves a catalyst for chlorophyll synthesis. Plants absorb iron in the form of Fe^{3+} from the soil. But in some cases plant root absorb ferrous (Fe^{2+}) ions



80. Which one of the following elements is not an essential micronutrient for plant growth?

(a) Ca (b) Mn
(c) Zn (d) Cu

AIPMT-2007

Ans. (a) : There are 17 essential nutrients required by plants for its healthy and proper growth. Now these nutrients are divided in to two categories.

Macronutrients or Macroelements-

These are the elements which are present in quantity of 1-10 mg per gram of dry weight of the cell.

They are- C, O, H, N, P, S, K, Mg, Ca

Micronutrients or Microelements or Trace element-

These are the elements which are present in a quantity equal to or less 1 mg per gram of dry weight of the cell.

They are- Fe, Mn, Mo, Ni, Zn, B, Cl, Cu

- Ca is an important essential macronutrient required by plants in large quantities primarily for cell wall synthesis.

81. In which of the following, all three are macronutrients

(a) Nitrogen, Potassium, phosphorus
(b) boron, zinc, manganese
(c) Iron, copper, molybdenum
(d) Molybdenum, magnesium, manganese

NEET-2016 Phase-I

Ans. (a) : Macronutrients: The elements which are required in large amounts by plants are known as macronutrients. It includes carbon, Hydrogen, Nitrogen, Oxygen, Phosphorus, potassium, calcium, Magnesium and Sulphur.

82. Study the following lists

List I	List II
(A) Photolysis of water	**1. Zinc**
(B) Diazotrophy	**2. Copper**
(C) Cytochrome C oxidase	**3. Manganese**
(D) Biosynthesis of IAA	**4. Molybdenum**
	5. Boron

	A	B	C	D
(a)	3	2	1	5
(b)	3	4	2	1
(c)	5	2	3	4
(d)	4	1	3	2

AP EAMCET-2009
BHU PMT (Mains)-2011

Ans. (b) : Manganese (Mn)- It is absorbed in the form of Mn^{2+}. It activates many enzymes involved in photosynthesis, respiration and nitrogen metabolism. The best defined function of Mn is in the splitting of water liberate O_2 during photosynthesis.

- Molybdenum fixes atmospheric N_2 i.e. diazotrophy.
- Complex- IV is a cytochrome C oxidase enzyme. It consist of cytochrome- a, cytochrome a_3, haem and **Copper** ions as prosthetic group.
- **Zinc -** Plant absorb zinc from the soil as **zinc ions**. It activates enzymes like carboxylase. It is required for the synthesis of auxin **i.e. IAA.**

83. The most abundant element present in the plant is :-

(a) Nitrogen (b) Manganese
(c) Iron (d) Carbon

AIPMT-2004

Ans. (d) : Carbon found in all organic molecules. Carbon is most abundant element found in plants. Carbon is one of the macronutrient.

- Plants use carbon dioxide during photosynthesis they take in carbon dioxide and convert it into energy for growth.
- When the plant dies CO_2 is given off from the decomposition of plant.

Carbon is constituent of organic compounds. It is one of the non-mineral element.

84. Which one of the following is not a microelement for plants?

(a) Cu (b) B
(c) Zn (d) Cr

AIIMS-2009

Ans. (d) : Cr is not a microelement for plant. Plant require many organic and inorganic nutrients to complete their life-cycle. It has been estabilized that some elements are required by plants in relatively large amount and are called **major elements** or **macronutrients**, e.g., C, H, O, N, S, P, K, Ca and Mg.

Microelements or minor elements or trace elements are required by plants in very small amount, less than 1 ppm, e.g., Fe, Cu, B, Zn, Mn, Mo, Cl.

85. Plants require sulphur for:

(a) DNA replication (b) protein synthesis
(c) synthesis of glucose (d) formation of ATP

DUMET-2002

Ans. (b) : Plant required sulphur for protein synthesis. Sulphur (S) is an essential macronutrient for plant growth and development. It is mainly involved in the formation of proteins and enzymes.

86. Minamata and itai-itai ('ouch - ouch') disease, respectively are caused due the metal pollution of:

(a) Mercury and Cadmium
(b) Mercury and Nickel

@apna_pdf

(c) Mercury and Copper
(d) Mercury and Zinc

MP PMT-2013

Ans. (a) : Minamata- It is neurological syndrome caused by severe mercury poisoning.
Itai - Itai disease is caused by cadmium (Cd) exposure, produced as a result of human activites related to industrialization, and this condition was first recognized in Japan in the 1968s.

87. The macronutrient which is an essential component of all organic compounds, yet not obtained by plants from soil, is
(a) Carbon (b) Nitrogen
(c) Magnesium (d) Phosphorous

Karnataka CET-2005

Ans. (a) : Carbon is a macronutrient which not obtained from soil. It is obtained from the air in the form of CO_2 gas. Those nutrient which required by the plants in large amount is called macronutrients.
Ex. C, H, O, P, K, N, S etc

88. Match the following:

List A	List B
(A) Mg	(i) Splitting of H_2O during photosynthesis
(B) Mo	(ii) Germination of Pollen grain
(C) Mn	(iii) Constituent of chlorophyll
(D) B	(iv) Component of Nitrate reductase
	(v) Synthesis of Auxins

	A	B	C	D
(a)	(ii)	(v)	(iv)	(i)
(b)	(iii)	(iv)	(ii)	(i)
(c)	(iii)	(v)	(iv)	(i)
(d)	(iii)	(iv)	(i)	(ii)

AP EAMCET-2015

Ans. (d) : Magnesium(Mg)- Constituent of the ring structure of chlorophyll
Molybdenum(Mo)- Component of Nitrate reductase and nitrogenase enzyme of nitrogen metabolism.
Maganese(Mn)-Splitting of H_2O during photosynthesis
Boron(B)- Germination of Pollen grain.

89. A plant require magnesium (Mg) for
(a) holding cells together
(b) protein synthesis
(c) chlorophyll synthesis
(d) cell wall development

JIPMER-2011

Ans. (c) : Magnesium is the central core of the chlorophyll molecule in plant tissue. So, magnesium is an important constituent of chlorophyll molecule. Thus plant requires magnesium for chlorophyll synthesis.

90. Some effects of sulphur dioxide and its transformation products on plant include
(a) plasmolysis
(b) golgi body destruction
(c) protein dis-integration
(d) chlorophyll destruction

Manipal-2008

Ans. (d) : A high atmospheric concentration of sulphur dioxide results in extensive tissue damage because the sulphur dioxide reacts with the plant water to form sulphuric acid that damages plant cells by the breakdown of chlorophyll molecule due loss of Mg^{++} leading to decreased photosynthesis.

91. When one element is involved in opening and closing of stomata, the other helps to maintain\ the ribosome structure. They are
(a) Potassium and calcium
(b) Phosphorus and sulphur
(c) Potassium and magnesium
(d) Iron and magnesium
(e) Calcium and sulphur

Kerala PMT-2014

Ans. (c) : Potassium Plays an important role in the opening and closing of stomata. It changes the turgor pressure of the guard cells causing the closing and opening of stomata.
Magnesium plays an important role in the association of subunits of ribosomes during protein synthesis and in general maintains the structure of ribosome.

92. Which of the following groups of minerals are micronutrients?
(a) Magnesium, Manganese, Copper, Boron and Phosphorus
(b) Manganese, Copper, Magnesium, Zinc and Boron
(c) Nitrogen, Potassium, Manganese, Copper and Iron
(d) Iron, Manganese, Copper, Molybdenum and Zinc
(e) Carbon, Potassium, Phosphorus, Nitrogen and Oxygen

Kerala PMT-2014

Ans. (d) : A micronutrient is a chemical element or substance required in trace amount for the normal growth and development of living organism. E.g. Boron (B), Zinc (Zn), Maganese (Mn), Iron (Fe), Copper (Cu), Molybdenum (Mo), chlorine (Cl).
• Macronutrients are generally present in plant tissues in large amount (In excess of 10 m mole kg^{-1} of dry matter). The macro nutrients are- C, H, O, N, P, S, K, Ca, Mg.

93. The principal cation in alkaline soil, is
(a) Na^+ (b) K^+
(c) Ca^{2+} (d) None of these

VMMC-2011

Ans. (c) : Principal cation in alkaline soil is Ca^{2+} (Calcium).
- Alkaline soil refers to a soil with a high pH level (~ 7.3)
- It is caused by the receiving water of a soil contains highly alkaline substance i.e. Ca or Mg carbonates.
- High content of calcium prevents plants from absorbing most of other nutrients.

94. A metal ion involved in stomatal regulation is
(a) iron (b) potassium
(c) zinc (d) magnesium

MGIMS Wardha-2004
UP CPMT-2004

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Ans. (b) : Metal ion involved in stomatal regulation is Potassium (K^+).

- Two guard cells surrounding leaves and control closing and opening of stomata via increase in solute content during closing.
- Decrease in solute content during opening. Potasium helps to maintain an anion-cation balance in cells, opening and closing stomata.
- Guard cells accumulates potassium resulting stomatal opening.
- Release of K^+ resulting Stomata closing.

95. Which one is the cofactor of carbonic anhydrase?

(a) Iron (Fe) (b) Zinc (Zn)
(c) Copper (Cu) (d) Magnesium (Mg)

WB JEE-2010

Ans. (b) : Zinc is the cofactor of carbonic anhydrase.

- Carbonic anhydrases are enzymes which acceleration the interconversion between CO_2 and HCO_3^- (bicarbonate)
- Zinc is a cofactor for enzyme carbonic anhydrase which is essential to uptake of carbon during photosynthesis.
- Cofactor are the non- proteinaceous part of enzyme necessary for activity of an enzyme. E.g. Zn is cofactor necessary for the activity of carbonic anhydrase enzyme.

96. Which is the importance of molybdenum in plants metabolism ?

(a) Sulphur reduction
(b) Carbon assimilation
(c) Nitrate reduction
(d) None of these

Punjab MET-1999

Ans. (c) : Molybdenum is an essential micronutrient required for Nitrogen metabolism.

- Mo plays on important role in Nitrogen assimilation, purine degradation, phytohormone synthesis.
- In non-leguminous plants, Mo regulates conversion of nitrates into proteins.
- It is necessary for the function of Nitrogenase activity of leguminous plants.

97. Which of the following minerals helps in N_2 fixation?

(a) Copper (b) Zinc
(c) Manganese (d) Molybdenum

Manipal-2012
AFMC-2002
JandK CET-2009

Ans. (d) : Molybdenum plays an important role in N_2 fixation as it regulates conversion of nitrates into protein.

- Required for the activity of nitrogenase enzyme activity in leguminous plants.
- It is vital for reduction of nitrate → nitrite.
- Important role in protein synthesis, Nitrogen fixation deficiency causes whiptail disease in cabbage.

98. Reduced availability of nitrogen during late growth causes :

(a) increase in the carbohydrate content of fruits and storage organs
(b) decrease in the carbohydrate content of fruits and storage organs
(c) increase in the ethylene content of fruits and storage organs
(d) decrease in the ethylene content of fruits and storage organs

BHU PMT (Mains)-2005

Ans. (a) : During late growth of plants, reduced availability of Nitrogen causes increase in Carbohydrate content of fruits and storage organs of plants.

- N helps in protein synthesis, reduced availability of H causes low protein content in storage organs of plants.
- When N is low, plant roots also grow laterally.
- Low N content causes low protein levels in grains e.g. Corn and Wheat.

99. The mineral constituent of the cell wall is

(a) Fe (b) Mg
(c) K (d) Ca

BHU PMT (Mains)-2011
Haryana PMT-2008
JIPMER-2008

Ans. (d) : Mineral component of cell wall is "Calcium".

- Ca stabilizes cell wall structures, acidic growth ion exchange property.
- Ca needed for growth and development of plants under stress conditions and also in non-stressed conditions.
- Ca is a macronutrient and helps in structural components of cell wall in the form of calcium pectate.
- Main constituent of cell wall which holds cell wall together and keeps it rigid and provide mechanical strength.

100. Whiptail disease is caused by the deficiency of:

(a) Zn (b) Bo
(c) Mo (d) Mn

JIPMER-1998

Ans. (c) : Whiptail disease in cabbage is due to deficiency of Molybdenum (Mo)

- Mo plays important role in Nitrogen fixation.
- Symptoms includes chlorosis of leaf margins and whitening and yellowing of whole leaves, stunted growth.
- In sever condition deficiency, only midrib is formed. Leaf blades do not develop properly and become strap like and growing point is deformed hence condition known as "Whiptail".

101. One among the following is a micronutrient?

(a) Mg (b) Ca
(c) S (d) Cu

UP CPMT-2012

Ans. (d) : Copper is micronutrient are also known as trace elements as they are required in very low content. Hence, called "Micronutriens".

- Other micronutrients are – Boron, Manganese, Zinc, Copper, Molybdenum, Chlorine, Nickel.
- Deficiency of Cu leads to following disease –

Plants	Disease
Citrus plant	Die Back disease
Cereals and Legumes	Reclamation disease

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102. Assertion : Deficiency of sulphur causes chlorosis in plants.
Reason : Sulphur is a constituent of chlorophyll, proteins and nucleic acids.
(a) If both assertion and reason are true and reason is the correct explanation of assertion
(b) If both assertion and reason are true but reason is not correct explanation of assertion
(c) If assertion is true but reason is false
(d) If both assertion and reason are false

HP CET-2011

Ans. (c) : Deficiency of sulphur leads to chlorosis in plants i.e. insufficient chlorophyll is formed.
- If is essential for root formation and formation of vitamins and coenzymes.
- S leads to retardation in cell division and stops fruit formation in plants.
- Sulphur is not a constituent of chlorophyll but it is a component of protoplasm.

103. Function of zinc in plants is
(a) sugar transport
(b) activation of enzymes
(c) cell elongation
(d) pollen germination

JandK CET-2014

Ans. (b) : Function of Zinc in plants is activation of enzymes and it is essential for the synthesis of tryptophan which is precursor of IAA/Auxin.
- If also involved in activation of several enzymes like carboxylases and alcohol dehydrogenases.
- Deficiency causes little leaf of Apples and Peeches and it suppresses seed formation in plants.

104. Which one of the following element is not an essential micronutrient for plant growth?
(a) Manganese (b) Zinc
(c) Copper (d) Calcium

Rajasthan PMT-2010

Ans. (d) : Calcium is not an essential micronutrients because it is a macronutrients.
- Macronutrients are required in large amount by the plants.
- Macronutrient includes - C, H, O, N, P, K, Mg, Ca, S
- Calcium plays an important role in middle lamella and cell wall formation and also stimulates development of root hairs.
- Involved in apical meristem growth and in cell division.

105. Micronutrients are needed in amounts equivalent to
(a) 8 m mole/kg of dry matter
(b) 18 m mole/kg of dry matter
(c) 25 m mole/kg of dry matter
(d) 30 m mole/kg of dry matter

AMU-2010

Ans. (a) : Micronutrients are needed in very small amount i.e. 8 m mole/kg of dry matter.
- These elements are required by plants in small amount less than 10 m mole/kg of dry matter.

106. Macroelements must generally be present in the plant tissues in concentration of at least
(a) 0.001 mg/g dry matter
(b) 0.01 mg/g dry matter
(c) 0.1 mg/g dry matter
(d) 1.0 mg/g dry matter.

AMU-1998

Ans. (d) : Macronutrients are required by plants in large amounts i.e. 1.0 mg/g dry matter.

Elements	% of dry weight
C	45%
O	45%
H	6%
N	1.5%
K	1%
C	0.5%
Mg	0.2%
P	0.2%
S	0.1%

107. Potassium is useful in development of
(a) fibre (b) pith
(c) parenchyma (d) None of these

CG PMT-2007

Ans. (a) : Potassium is useful in development of fibre.
- It is important for producing a high quality, high yielding cotton crop.
- K improves soil fertility and soil nutrition and boost cotton yield.
- K affects fibre quality micronized, length and strength.

108. Plants absorb sulphur in the form of
(a) SO_4 from soil (b) SO_2 from air
(c) Both (a) and (b) (d) SO_3 from soil

CG PMT-2007

Ans. (c) : Plants need sulphur in the form of sulpate (SO_4^{2-}) This is the only form of sulphur which can be taken up by the roots and is the form in which it is used within the plants. Small amounts of sulfur dioxide gas can be absorbed through leaves, but this is of little consequence in the overall S nutrition of plants.

109. Vitamin containing cobalt is:
(a) A (b) B_6
(c) B_1 (d) B_{12}

Uttarakhand-2005
VMMC-2014

Ans. (d) : Vitamin containing cobalt is vitamin B_{12}. Vitamin B_{12}, also known as cyanocobalamine.
- It is a cobalt containing ring contravened modified tetrapyrrole.
- Main active biological forms of cobalamin are - Methylcobalamin and adenosylcobalamin.
- Methylcobalamin acts as cofactor in number of methyl transferase reaction.

110. Which of the following is a macronutrient ?
(a) Mo (b) Ca
(c) Zn (d) Mn

Haryana PMT-2007

@apna_pdf

Ans. (b) : Macronutrients are present in large quantity in plants.

- C, H, O, N, P, K, Mg, Ca, S are macronutrients.
- Calcium is obtained from soil in the form of calcium ion (Ca^{2+}).
- Main constituent in cell wall formation and middle lamella.
- As it is a mobile element, helps in translocation of food and minerals in plants.
- Important for apical meristem and growth of root hairs.
- Involved in mitosis division and thus growth of plant.

111. Which one of the following is not a micronutrient for plants?

(a) Magnesium (b) Molybdenum
(c) Boron (d) Zinc

JandK CET-2015
Rajasthan PMT-2000

Ans. (a) : Magnesium is a macronutrient not micronutrient.

- Magnesium is required in high quantity by plants.Since, Mg is main component of chlorophyll, it is necessary for green plants to perform photosynthesis.
- Mg is important part of respiratory enzymes, helps in synthesis of nucleoproteins.
- Deficiency of Mg leads to interveinal chlorosis in plants.

112. Micronutrients are

(a) Mn, Ni and Zn (b) O, Cu and B
(c) Mg, Mn and Mo (d) Ca, S and Fe

AMU-2012

Ans. (a) : Micronutrients are also known as trace elements as required in very low amount.

• The micronutrients are – Iron (Fe), Manganese (Mn), Copper (Cu), Molybdenum (Mo), Zinc (Zn), Boron (B), Chlorine (Cl), Nickel (Ni).

113. Which one of the following nutrients serve as microelements for plant growth?

(a) Manganese, copper, calcium
(b) Sodium, potassium, boron
(c) Sodium, nickel, chlorine
(d) Copper, molybdenum, zinc

CG PMT-2006

Ans. (d) : Copper, molybdenum, Zinc are microelements.

- Cu is component of plastocyanin acts as an activator of several enzymes, required for synthesis of vitamin C.
- Deficiency of Cu leads to chlorosis and Die Back disease in citrus and reclamation disease of legumes and aerials.
- Mo plays important role in modulation for leguminous plants. Mo helps in nitrogen fixation and deficiency leads to whiptail disease of crucifers.
- Zn is essential for synthesis of tryptophan and deficiency of Zn causes Mottled leaf disease and Little leaf disease of apple and peach and Khaira disease of rice.

114. Which one of the following micronutrient is required by plants in least quantity?

(a) Mo (b) B
(c) Zn (d) Mn

BHU PMT (Screening)-2011

Ans. (a) : Micronutrient that is required by plants in least quantity is Molybdenum (Mo).

- It is required by plants in 0.0001% of dry weight.
- Since, it is trace elements but plays an important role in modulation in Leguminous plants.
- Helps in the activity of "Nitrate reductase" enzyme.

115. Sleeping movements in Samanea saman leaves are regulated by:

(a) nitrogen (b) potassium
(c) phosphorus (d) magnesium

AP EAMCET-2002

Ans. (b) : Sleeping movements in samanea saman leaves are regulated by potassium.

- Sleeping movement/nyctinasty is movement of leaves and flowers of some species which take up sleeping position at night are known as "Nyctinastic movement" of plants.
- Samanea Saman is a tropical tree. It is also observed in leguminous plants i.e. Albizia, Cassia.
- Swelling and Shrinking of motor cells at the base of leaf induces nyctinastic motion and is totally depends upon differential turgor movements in specialized organ known as Pulvinus.
- Turgar movement is regulated by potassium (K^+) ions.

116. Match the words in column I with phrases in column II. Choose the correct combination from the given option.

Column - I	Column - II
A. Sulphur	**1. Found in plant hormone**
B. Zinc	**2. Important component for animals**
C. Magnesium	**3. Found in amino acid like methionine**
D. Iodine	**4. Component of sugar**
E. Manganese	**5. Nitrogenous component**
F. Molybdenum	**6. Structural component of photosynthetic pigment**

Codes

(a) A-3 B-1 C-6 D-2 E-4 F-5
(b) A-5 B-1 C-6 D-2 E-5 F-4
(c) A-3 B-6 C-1 D-2 E-4 F-5
(d) A-3 B-1 C-2 D-6 E-4 F-5

BVP-2013

Ans. (a) :

(a)	Sulphur	Found in amino acid methionine
(b)	Zinc	Found in plant hormone
(c)	Magnesium	Structural component of photosynthetic pigment.
(d)	Iodine	Important component for animals.
(e)	Manganese	Component of sugar
(f)	Molybdenum	Nitrogenous component

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117. Micro - nutrients are

(a) as important as macro-nutrient but are required in small amount
(b) less important than macro-nutrient
(c) called micro as they play only a minor role in plant nutrition
(d) none of the above

VMMC-2007 / JIPMER-2006
Rajasthan PMT-2005

Ans. (a) : Micronutrients are required in low amount but it is important as macronutrients.

- The concentration of micronutrients is less than 1 mg/gm of dry matter.
- They are toxic when it is used in excess amount
- Boron, Manganese, Iron, Zinc, Copper, Molybdenum, Chlorine, Nickel are micronutrients.

Micro Elements	Functions
Boron	Meristematic
Manganese	Activator of enzymes,Chlorophyll synthesis
Zinc	Synthesis of tryptophan (Auxin)
Copper	Component of plastocyanin.
Molybdenum	Nodule formation , H_2 fixation
Chlorine	Photolysis of water
Iron	Structural compound of porphyrine Cytochrome, Cytolase, Peroxide and Leghaemoglobin.

118. Insectivorous plant eats the insect for

(a) Na-K (b) nitrogen
(c) chlorine (d) phosphorus

BHU-PMT (Screening)-2008

Ans. (b) : They are strong plants that capture insects by an ingenious trap and digest them for nutrients. These plants are called insectivores plants. Insectivorous plants feed on insects to obtain nutrients, especially nitrogen. This is because they grow on soil poor in their nitrogen content.

119. Nickel contributes to the formation of one of the following

(a) urease (b) dehydrogenase
(c) rubisco protein (d) nitrate reductase

Haryana PMT-2011

Ans. (a) : Nickel contributes to formation of Urease

- Urease enzyme hydrolysis of urea into ammonia and carbon dioxide.

$$\text{Urea} \xrightarrow[\text{Urease}]{\text{Ni}} NH_3 + CO_2$$

- It plays an important role in mobilization of nitrogenous compounds in plants.
- Besides, Ni plays an important role in seed germination
- Deficiency of Ni causes chlorosis, narcotic lesions on leaves, seedling lost etc.

120. What is common in NAD, ATP and FMN?

(a) Zn (b) P
(c) Ca (d) Mg

Haryana PMT-2011

Ans. (b) : NAD, ATP and FMN is formed by phosphorous.

- Plants absorb phosphorus in the form of phosphate ions.
- Phosphorus is found abundantly in growing and storing organs of plants.
- Phosphorus is an energy carrier and forms part of ATP, NAD, FMN.

E. Technique of Absorption of Elements

121. Which among the following helps in absorption of phosphorus from soil by plants?

(a) Frankia (b) Rhizobium
(c) Glomus (d) Anabaena

JCECE-2018

Ans. (c) : Glomus is an arbuscular endomycorrhizal fungi and helps to absorb phosphorus from soil by mutual association of roots of higher plants and fungi. It is a best example of symbiotic association known as "Mycorrhiza".

- Term "Mycorrhiza" refers Mykos to "fungi" and rhiza means "roots".
- Phosphorus is essential for cell division and development of growing tip of plant.

122. Which of the following is not used as bioweapon?

(a) Bacillus anthracis
(b) Botulmum toxin
(c) Bacilius thuringiensis toxin
(d) Smallpox

DUMET-2010

Ans. (c) : Biological weapons are the most horrifying tools today. The biological weapons convention (BWC) of 1975 instructs all signatories to forego any biological weapon program. They are relatively cheap. A small private airplane with 100 kilograms of Anthrax can kill a million people on a day with moderate wind.

- Bacillus thuringiensis toxins used as bio insecticide against catterpillars, betels and flies.

123. Boron in green plants assists in: -

(a) Activation of enzymes
(b) Acting of enzyme cofactor
(c) Photosynthesis
(d) Sugar transport

AIPMT-2003 / Rajasthan PMT-2007

Ans. (d): Boron occurs in the soil, as a part of silicates boric acid, calcium borate and magnesium borate. It is available to the plants as boric acid and borates of calcium and magnesium. It plays a role in carbohydrate metabolism and translocation of sugar, is facilitated through the cell membrane through the agency of borate ion as it forms complex with the carbohydrate.

@apna_pdf

124. Mineral salt from soil enters into the cell in the form of:

(a) Salts (b) Molecules
(c) Ions (d) None of these

Rajasthan PMT-1995
JIPMER-1996

Ans. (c) : Plants absorb minerals in the form of ions from the soil. Minerals are the elements that are necessary for the proper functioning of the body. They are defined as the naturally occurring inorganic nutrients found in the soil.

125. The plant ash is an indication of

(a) organic matter of plant
(b) waste product
(c) mineral salts absorbed by plants
(d) None of the above

MGIMS Wardha-2004
UP CPMT-2004

Ans. (c) : Plant ash is an indication of mineral salts absorbed by plants. Plant ash is formed when plant are heated to high temperatures and water evaporates it gives plant ash.

- Plant ash contains less than 10% potash, 1% phosphate and trace amount of micronutrient such as Fe, Mn, B, Cu and Zn.
- Essential elements seen in plant ash are – Ca, Mg, Fe, S, P, Cl.

126. Which one of the following elements is not remobilised in leaf?

(a) Nitrogen (b) Phosphorus
(c) Potassium (d) Calcium

AMU-2010

Ans. (d) : Calcium is not remobilized in leaf. Soil is reservoir of nutrients for plants. In higher plants nutrients are mobilized from older, (senescing leaves) to younger leaves. This is known as Remobilization.

- The main motive of remobilization is to minimize mineral nutrient deficiency. It can be seasonal.
- Calcium is a structural component of middle lamella and cell wall. Thus remobilization of Ca does not takes place.

127. Which part of the root is most active in absorption of phosphate?

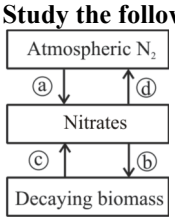
(a) Root cap (b) Meristematic zone
(c) Root hairs (d) Root apex

CG PMT-2010

Ans. (c) : Root hairs is a part of root which is most active in absorption of phosphate. Roots hairs cells improve plant water absorption by increasing root surface area to volume ratio which allows the root hair cells to take in more water when phosphorus moves to the root surface through osmosis. The presence of mycorrhizal fungi shows a symbiotic relationship with plant roots and extended thread like hyphae into the soil. Hence the uptake of phosphorus absorption is most active in root hairs.

F. Metabolism of Nitrogen and Nitrogen Cycle

128. Study the following model of Nitrogen cycle



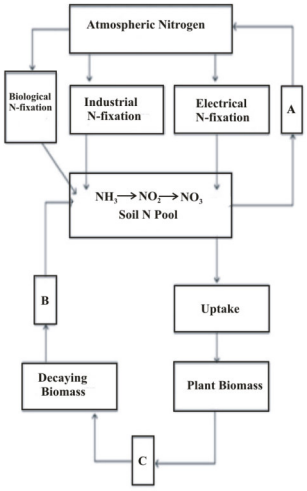
Identify the concerned bacterium in step ⓓ

(a) Nitrosomonas (b) Nitrobacter
(c) Nitrosococcus (d) Thiobacillus

AP EAMCET-25.04.2018 Shift-II
TS EAMCET-31.07.2022 Shift-II

Ans. (d) : Denitrifying bacteria are microorganisms whose action results in the conversion of nitrates in the soil to free atmospheric nitrogen. Example - *Thiobacillus denitrificans.*

129. Study the following illustration of nitrogen cycle and identify A, B and C in it.



	A	B	C
(a)	Denitrification	Producer biomass	Decomposing
(b)	Ammonification	Denitrification	Nitrification
(c)	Denitrification	Ammonification	Animal biomass
(d)	Nitrification	Denitrification	Recycling

TS EAMCET-09.08.2021 Shift-II

Ans. (c) : Nitrogen exists as two nitrogen atoms joined by a very strong triple covalent bond (N≡N). The process of conversion of nitrogen (N_2) to ammonia is termed as nitrogen fixation. In nature, lightning and ultraviolet radiation provide enough energy to convert nitrogen to nitrogen oxides (NO, NO_2, N_2O). Industrial combustions, forest fires, automobile exhausts and power- generating station are also sources of atmospheric nitrogen oxides. Decomposition of organic nitrogen of dead plants and animals into ammonia is called ammonification.

@apna_pdf

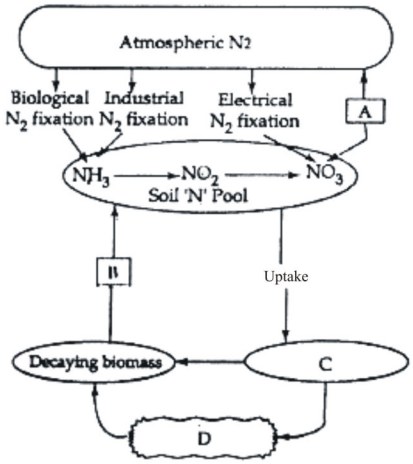
130. The most quickly available source of nitrogen to plants are

(a) Amide fertilizers
(b) Ammonia fertilizers
(c) Nitrate fertilizers
(d) Ammonia nitrate fertilizers

SRM JEEE-2019

Ans. (c) : Plants are obtain or absorb nitrogen from the soil in the form of nitrates.
Nitrate fertilizers are preferred due to the highest absorbing ability of nitrates by plants, than in any other form.
The nitrate is mostly used in the fertilizers. Nitrate is also used by the plants as the source of the food which help them in their development.

131. Study the cycle shown below and select the option which gives correct words for all the four blanks A, B, C and D.



	A	B	C	D
(a)	Denitrification	Nitrificaiton	Plants	Animals
(b)	Nitrification	Ammonification	Animals	Plants
(c)	Denitrification	Ammonification	Plants	Animals
(d)	Nitrification	Denitrification	Animals	Plants

AIPMT (Mains)-2010
TS EAMCET-28.09.2020 Shift-I

Ans. (c) : Among all gaseous cycle, nitrogen cycle plays very important role in an ecosystem. The conversion of nitrogen into nitrate via denitrification process, plant absorbs nitrate with later transported into leaves after nitrate reduced into ammonia via ammonification. Thiobacillus and Pseudomonas carries denitrification process, Nitrosomonas carries nitrification process as it oxidised ammonia into nitrite form.

132. Micorrhiza is useful for plants mainly due to

(a) Fixing atmospheric nitrogen
(b) Killing insect pests
(c) Providing resistance for abiotic stress
(d) Enhanced absorption of nutrients from soil

UP CPMT-2013

Ans. (d) : Mycorrhiza is a symbiotic association between higher plant roots and fungi. Their major role is to enhance nutrient and water uptake by the host plant by exploiting a larger volume of soil than roots alone can do.

133. An insectivorous plant having glandular structures on its leaf secreting stickly fluid is

(a) sundew plant (b) aldrovanda
(c) venus fly trap (d) all of these.

AIIMS-1997

Ans. (a) : The upper surface of leaf blade or lamina of Sundew bears a number of 100-200 club-shaped hair or tentacles. Their tips are swollen glandular and reddish. The glandular heads of the tentacles secrete a thick sticky juice which shines in the Sun like few drops.

- Dionaea muscipula or vinus fly trap have leaves with trigger by thin hairs on their inner surfaces.
- Aldrovanda vesiculosa or water wheel plant have trap mechanism like Dionaea. The genus Aldrovanda belongs to the family Droseraceae.

134. Insectivorous plants digest insects to get an essential nutrient. Other plants generally get this nutrient from the soil. What is this nutrient?

(a) Oxygen (b) Carbon dioxide
(c) Nitrogen (d) Phosphates

KVPY (SA)-2010

Ans. (c) : Insectivorous plants generally grow in the nutrient deficient soil (mainly nitrogen deficient) and hence it requires a different source for its nutrients. The plant gains required nutrients (mainly nitrogen) by digesting the trapped insects.

135. In which one of the following nitrogen is not a constituent: -

(a) Idioblast (b) Bacteriochlorophyll
(c) Invertase (d) Pepsin

AIPMT-2003

Ans. (a): A idioblast is an isolated plant cell that differs from neighbouring tissues. They have various functions such as storage of reserves, excretory materials, pigments and minerals. They could contain oil, latex gum, resin, tanin or pigments.
Invertase and pepsin are enzymes and they contain nitrogen. Bacteriochlorophyll are photosynthetic pigments that occur in various phototrophic bacteria.

136. The conversion of ammonia into nitrites and nitrates is called:

(a) ammonification (b) nitrification
(c) denitrification (d) none of these

JandK CET-2005

Ans. (b) : Nitrifying bacteria in the soil transform ammonia into nitrite. The nitrite is subsequently transformed into nitrate. This process is described as nitrification.

137. Higher plants obtain nitrogen from soil that has:

(a) Six forms (NO_3, NO_2, N_2O_2, N_2, NH_2OH, NH_3) of nitrogen with oxidation number ranging from +5 to –3
(b) Six forms (NO_3, NO_2, N_2O_2, N_2, NH_2OH, NH_3) of nitrogen with oxidation number ranging from +6 to –3
(c) Five forms (NO_3, NO_2, N_2, NH_2OH, NH_3) of nitrogen with oxidation number ranging from +5 to –3
(d) Five forms (NO_3, NO_2, N_2, NH_2OH, NH_3) of nitrogen with oxidation number ranging from +6 to –3

MP PMT-2013

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Ans. (c) : Higher plants obtain nitrogen from soil that has five forms (NO_3, NO_2, N_2, NH_2OH, NH_3) of nitrogen with oxidation number ranging from +5 to –3.

138. Pseudomonas is an important component of nitrogen cycle. It
(a) fixes elemental nitrogen
(b) produces elemental nitrogen
(c) transfers elemental nitrogen
(d) changes ammonium nitrogen to nitrate state

JandK CET-2013

Ans. (b) : Pseudomonas is a denitrifying bacteria which convert ionic forms of nitrogen into nitrogen gas.

139. Conversion of organic nitrogen into Ammonia, N_2 gas into ammonia, nitrates into ammonia, ammonia into nitrates respectively known as
(a) Nitrogen fixation, nitrate reduction, Nitrification, ammonification
(b) Ammonification, Nitrogen fixation, Nitrate reduction, Nitrification
(c) Nitrification, Ammonification, Nitrogen fixation, Nitrate reduction
(d) Nitrogen fixation, Nitrate reduction, Denitrification, Ammonification

AP EAMCET-2015

Ans. (b) : Ammonificaiton- Nitrogen into ammonia.
Nitrogen fixation- N_2 gas into ammonia.
Nitrate reduction- Nitrates into ammonia.
Nitrification- Ammonia into nitrates.

140. Urea is used in the soil to supplement:
(a) phosphorus (b) nitrogen
(c) potassium (d) zinc

JandK CET-2003

Ans. (b) : Urea is a source of nitrogen, an essential nutrient for crop growth and development.
The agricultural uses urea, white crystalline solid have 46% Nitrogen.

141. Consider the following statements.
(i) Sulphur is present in two amino acids – cysteine and valine
(ii) Low level of N, K, S and Mo causes an inhibition of cell division
(iii) The microbe that produces nitrogen fixing nodules on the roots of non-leguminous plant "Alnus" is Frankia
(iv) Denitrification is carried by the bacteria Nitrosomonas and Nitrobacter
(a) (i) and (ii) alone are correct
(b) (i) and (iii) alone are correct
(c) (ii) and (iii) alone are correct
(d) (ii) and (iv) alone are correct
(e) (i) and (iv) alone are correct

Kerala PMT-2013

Ans. (c) :
(i) Sulphur is present in two amino acids-methionine and cysteine.
(ii) Low level of N,K,S and Mo causes an inhibition of cell division.
(iii) The Alnus genus forms symbiosis with the actinobacteria Frankia sp. Frankia is a soil actinomycetes that fix nitrogen, both under symbiotic and free-living aerobic condition.
(iv) Denitrification is carried by Bacteria Pseudomonas and Thiobacillus.

G. Biological Nitrogen Fixation

142. Free living, aerobic, non-symbiotic, non-photosynthetic nitrogen fixing bacteria in soils is
(a) Azotobacter (b) Rhizobium
(c) Clostridium (d) Anabaena

JandK CET-2004,2008 / CMC Vellore-2007,2008
AMU-2006 / Haryana PMT-2005, 2003, 2000
BHU PMT-2003 / VMMC-2003, 2002
DUMET-2009 / JIPMER-2005
AIPMT-1994, 1990,1997 / JandK CET-2005

Ans. (a) : Azotobacter is free – living, aerobic, non-photosynthetic, nitrogen fixing bacteria. These bacteria are present in soil. It converts atmospheric nitrogen into ammonia in the presence of oxygen for the further plant usage. Azotobacter do not form any symbiotic relationship. These are primitive type of bacteria.
- **Free living aerobic N_2 fixing Bacteria** :
- Photosynthetic : Chlorobium, chromatium
- Non-photosynthetic : Azotobacter, Derxia, Beijerinckia.

143. The conversion of NO_3 to N_2 is called
(a) nitrification (b) denitrification
(c) ammonification (d) nitrogen fixation

HP CET-2012 / CMC Ludhiana-2012
JCECE-2005 / UP CPMT-2003
DUMET-2001,2005 / Manipal-2000
Punjab MET-2004

Ans. (b) : Conversion of Nitrate to Nitrogen is called denitrification, which is anaerobic process. It is done by the thiobacillus bacterium also called "Denitrifying organisms".
E.g. *Thiobacillus*, *Pseudomonas.*
Pseudomonas species. is an excellent microorganism for use in bioremediation because of the flexibility and plasticity of its metabolic pathways.

144. A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the aquatic fern Azolla is
(a) Tolypothnx (b) Chlorella
(c) Nostoc (d) Anabaena

Manipal-2012, 2007,2014 / AIPMT-2004
CMC Vellore-2012 / AFMC-2008
DUMET-2008 / JCECE-2012

Ans. (d) : Azolla are aquatic fern found in symbiotic association with Anabaena [Blue green Algae), which is free living Blue green algae, helps in nitrogen fixation.
- Anabaena contains filamentous thin walled will present lateral or terminal in a form of chain called heterocytsts.
- There heterocysts are the silte of N_2 fixation in B.G.A. and lacks photosystem II and acquires anaerobic condition for N_2 fixation. In this, glutamine is the main product which translocates from heterocyst to vegetative cell.
- Maltose is a photosynthetic product moves from heterocysts to vegetative cell.
- Nitrogenase plays important role in N_2 fixation in Cyanobacteria also.

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145. Bacterium which reduces nitrates in soil to nitrogen is

(a) Nitrosomonas (b) Pseudomonas
(c) Rhizobium (d) Clostridium

Punjab MET-2008 / JandK CET-2012
AMU-2010 / AMU-2009
Manipal-2010 / HP CET-2018

Ans. (b) : *Pseudomonas aeruginosa* can reduce nitrate to nitrite and eventually to nitrogen gas by the denitrification patway thereby providing the organism with a mode of respiration and ATP generation in the absence of oxygen.

146. Nitrifying bacteria are those which can convert

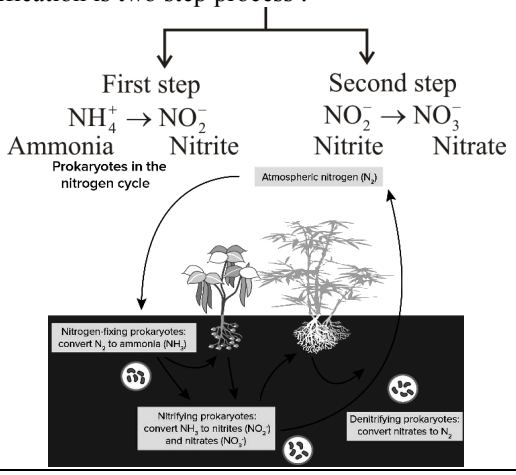
(a) atmospheric nitrogen into ammonia
(b) ammonia into nitrites
(c) nitrites into nitrates
(d) nitrates into ammonia

CG PMT-2006 / Haryana PMT-2008
JIPMER-2008 / Uttarakhand PMT-2006

Ans. (b) : Nitrifying bacteria are those bacteria which can convert ammonia into nitrites. The process of nitrification is an aerobic process and oxidative process.

- Nitrifying bacteria are chemolithotrophic organisms i.e. get their energy from oxidation of inorganic nitrogen compounds.
- Nitrifying bacteria are : Nitrosomonas, Nitrosococcus, Nitrobacter etc.

Nitrification is two step process :



147. The enzyme responsible for the reduction of molecular nitrogen to the level of ammonia in the leguminous root nodule is

(a) amminase (b) nitrogenase
(c) nitrate reductase (d) nitrite reductase

AMU-2006 / CMC Ludhiana-2008
Kerala PMT-2009 / AIIMS-2000

Ans. (b) : The enzyme Nitrogenase is responsible for reduction of molecular nitrogen to the level of ammonia in the leguminous root nodule. Nitrogenase comprises larger Mo-Fe protein and smallest Fe Protein.

- Fe Protein reacts with ATP and Mg^{2+} and receives electron from fesseaoxin when it is oxidized.
- Mo-Fe protein of Nitrogenase complex combines with reducing substrates i.e. H_2 and yields two molecules of NH_3.

$$H_2 + 16ATP + 8e + 10H^+ \xrightarrow{Mg^{2+}} 2NH_4^+ + H_2 + 16ADP + 16Pi$$

148. $2NH_3 + 3O_2 \xrightarrow{a} 2NO_2 + O_2 \xrightarrow{b} 2NO_3$ in the above reaction a and b are

(a) Thiobacillus and Nitrococcus
(b) Nitrosomonas and Nitrobactor
(c) Nitrococcus and Nitrosomonas
(d) Nitrobactor and Nitrosomonas

AP EAPCET-22.05.2023, Shift-I

Ans. (b) : The first reaction (a) is the oxidation of ammonia to nitrite by the bacteria Nitrosomonas. The second reaction (b) is the oxidation of nitrite to nitrate by the bacteria Nitrobacter.

149. Pseudomonas and Thiobacillus carry out the following

(a) Putrificaiton (b) Ammonificaiton
(c) Nitrification (d) Denitrificaiton

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : Pseudomonas and Thiobacillus are both denitrifying bacteria. They use nitrate as an electron acceptor, reducing it to nitrogen gas.

- Putrificaiton is the breakdown of organic matter by bacteria in the absence of oxygen.
- Ammonification is the conversion of organic nitrogen to ammonia by bacteria.
- Nitrification is the oxidation of ammonia to nitrate by bacteria.

150. Match Column-I with Column-II.

	Column-I		Column-II
(A)	Nitrococcus	(i)	Denitrification
(B)	Rhizobium	(ii)	Conversion of ammonia to nitrite
(C)	Thiobacillus	(iii)	Conversion of nitrite to nitrate
(D)	Nitrobacter	(iv)	Conversion of atmospheric nitrogen to ammonia

Choose the correct option

(a) (A)-(ii), (B)-(iv), (C)-(i), (D)-(iii)
(b) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(c) (A)-(iii), (B)-(i), (C)-(iv), (D)-(ii)
(d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : Nitrococcus is a genus of Gram negative bacteria that oxidize ammonia to nitrous acid.

- Rhizobium is a genus of gram-negative soil bacteria that fix nitrogen (convert nitrogen gas into ammonia).
- Thiobacillus is a denitrifying bacteria that reduces soil nitrates and convert them into free nitrogen.
- Nitrobacter plays a role in the nitrogen cycle by oxidizing nitrite to nitrate.

151. Identify the correct combination from the following:

(a) Nostoc - Autotrophic - Fixes atmospheric N_2
(b) Glomus - Free living - Increases plant growth
(c) Azotobacter - Symbiont - Bioferitilizer
(d) Oscillatoria - Symbiont - Facilitates 'P'absorption by plants

TS EAMCET-31.07.2022 Shift-I

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Ans. (a) : Nostoc belong to Cyanobacteria genus, and it can be used as biofertilizer. It is also called the blue-green algae. Nostoc converts atmospheric nitrogen into ammonia, which can be further converted to a suitable form for plant growth. Biofertilizers enhance the quality of plants and soil.

152. Which of the following pair represents free living nitrogen fixing aerobic bacteria?

(a) Rhizobium and Frankia
(b) Azotobacter and Beijerinckia
(c) Anabaena and Rhodospirillum
(d) Pseudomonas and Thiobacillus

NEET (Re-Exam)-04.09.2022

Ans. (b) : Two Kinds of nitrogen - fixing bacteria are recognized:-

(i) Free-living (non-symbiotic bacteria. including the cyanobacteria (or blue green algae) Anabaena and Nostoc and genera such as Azotobacter, Beijerinckia, and Clostridium.
(ii) Mutualistic (Symbiotic) bacteria such as Rhizobium associated with leguminous plants (e.g.:- Various members of the pea family), and certain Azospirillum species, associated with cereal grasses.

• Thiobacillus is gram negative Betaproteobacteria. Thiobacillus oxidizes sulphur compounds to reduction of oxidized nitrogen compounds to dinitrogen.

Frankia is symbiotic N2 fixing filamentous bacteria which is associates with non-leguminous plants as Alnus.

153. Nitrogen fixation in root nodules of *Alnus* is brought about by:

(a) *Frankia* (b) *Azorhizobium*
(c) *Bradyrhizobium* (d) *Clostridium*

NEET-2022 / AIPMT-2008 / JIPMER-2014

Ans. (a) : *Frankia* is a genus of nitrogen fixing, filamentous bacteria that live in symbiosis with actinorhizal plant but this is non-leguminous. Hence nitrogen fixation in root nodules of *Alnus* is brought about *Frankia*. The best known example in temperature involved in nodule formation is an Actinomycetes, called the *Frankia*.

154. Assertion (A) :- Some plants growing in N_2 rich soils can obtain their nitrogen from insects

Reason (R) : - Bacteria inhabiting the root system of Fabaceae plants can fix atmosphere nitrogen

The correct option among the following is

Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : Some plants growing in N_2 deficient soil can obtain their nitrogen from insects. Family fabaceae is the family of leguminous plants. These plants have a symbiotic association with the bacteria called Rhizobium that live in their root nodules. They are capable of fixing atmospheric nitrogen into ammonia.

155. Assertion (A): Ammonia is first oxidized to nitrites by Nitrosomonas bacterium

Reason (R): Nitrites are further oxidized to nitrates with help of Nitrosococcus bacterium

(a) Both A and R are correct and R is the correct explanation of A
(b) Both A and R are correct and R is not the correct explanation of A
(c) A is correct but R is wrong
(d) A is wrong but R is correct

AP EAPCET-07.09.2021 Shift-I

Ans. (c) : Ammonia is first oxidized to nitrite by the bacteria Nitrosomonas and Nitrosococcus. The nitrite is further oxidized to nitrate with the help of the bacteria Nitrobacter.

156. Match Column-I with Column-II.

	Column-I		Column-II
(A)	**Nitrococcus**	**(i)**	**Denitrification**
(B)	**Rhizobium**	**(ii)**	**Conversion of ammonia to nitrite**
(C)	**Thiobacillus**	**(iii)**	**Conversion of nitrite to nitrate**
(D)	**Nitrobacter**	**(iv)**	**Conversion of atmospheric nitrogen to ammonia**

Choose the correct answer from options given below.

	(A)	(B)	(C)	(D)
(a)	(iv)	(iii)	(ii)	(i)
(b)	(ii)	(iv)	(i)	(iii)
(c)	(i)	(ii)	(iii)	(iv)
(d)	(iii)	(i)	(iv)	(ii)

NEET-2021

Ans. (b) :

(a)	Nitrococcus	(ii)	conversion of ammonia to nitrite.	Nitrifying bacteria
(b)	Rhizobium	(iv)	Conversion of atmospheric nitrogen to ammonia.	Endosymbiotic with root of legumes
(c)	Thiobacillus	(i)	Denitrification.	Free living N_2 fixer bacteria
(d)	Nitrobacter	(iii)	Conversion of Nitrite to nitrate	Chemoautotrophic bacteria

157. Which one of the following bacteria has potential for nitrogen fixation?

(a) Nitrosomonas (b) Nitrobacter
(c) Nitrosococcus (d) Rhizobium

CG PMT-2006
AP EAMCET-24.09.2020 Shift-II / BVP-2002

Ans. (d) : Rhizobium is the bacterium which fixes Nitrogen in Leguminous plant. Rhizobium is soil bacteria, gram – negative, aerobic rod-shaped, free living bacteria. Leguminous plants releases some chemotactic substances. Rhizobium attracts towards it and binds with the cells of root hairs of plant and causes curling in root hair, then bacterium invades root epidermis and multiplies and replicates. Formation of

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infection threads occurs in cortex cell. Bacteria secretes kinetin, plant secretes Auxin and division of cortical cells occurs. Now, bacteria detaches from infection thread and forms peribacterial cells/bacteroids. These bacteroids forms nodule and helps in N_2 fixation by nitrogenase enzyme and leghaemoglobin protein

158. The following are the host plants along with the microorganisms which fix atmospheric nitrogen. Find out their correct match.

I. Frankia - Alnus

II. Rhizobium - Alfalfa

III. Anabaena- Wheat

IV. Rhodospirillum - Casuarina

(a) I and II only (b) I and III only

(c) II and III only (d) II and IV only

TS EAMCET-28.09.2020 Shift-II

Ans. (a) : • The Alnus genus forms symbiosis with the actinobacteria Frankia sps. and ectomycorrhizal fungi.

• Rhizobium has a symbiotic relationship with the root nodules of leguminous plant such as Garden pea, Alfalfa, Sweet clover etc.

159. Frankia fixing of N_2 occurs in which of the following non-leguminous plants?

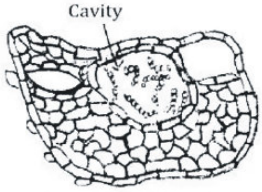
(a) Azolla (b) Pinus

(c) Alnus (d) Riccia

AP EAMCET-25.09.2020 Shift-I

Ans. (c) : *Frankia* is a nitrogen fixing microbe and it establishes a symbiotic relationship with the roots of trees belongs to the genus *Alnus*. It produce nitrogen fixing nodule on the roots of these plants. *Alnus* sps. are non-leguminous plants.

160. The figure given below is T.S. of Azolla leaf, the filaments present in the cavity of the leaf are of _____



T.S of Azolla leaf

(a) Nostoc (b) Tolypothrix

(c) Anabaena (d) Oscillatoria

MHT CET-04.10.2020 Shift-I

Ans. (c) : Azolla and the blue-green alga *Anabaena azollae* maintain a symbiotic relationship.

• The filaments present in the cavity of the leaf are Anabaena. Anabaena is genus of Nitrogen-fixing blue-green algae. They have bead like.

161. In which one of the following processes are the bacteria Nitrosomonas, Nitrosococcus and Nitrobacter involved ?

(a) Denitrification (b) Deamination

(c) Eutrophication (d) Nitrification

MHT CET-07.10.2020 Shift-I

Ans. (d) : Nitrification is the process in which conversion of Ammonia and Ammonium compounds are oxidized by nitrifying bacteria like Nitrosococcus, Nitrobacter, Nitrosomonas.

• Nitrosomonas is gram negative motile bacteria

• Nitrosococcus is large cocci, motile bacteria

• Nitrobacter is short rod – shaped bacteria motile/non-motile. And nitrosomonas converts Ammonia into nitrite.

$$2NH_3 + 3O_2 \xrightarrow[\text{nitrosococcus}]{\text{nitrosomonas}} 2NH_2OH + \text{Energy}$$

$$NH_2OH + H_2O \longrightarrow NO_2^- + 5H^+ + 4e^-$$

162. Assertion (A) : Free- living bacteria such as Rhizobium and Frankia can help in biological fixation of dinitrogen in the roots of angiospermic plants.

Reason (R) : Prokaryotes exclusively contain nitrogenase enzyme which can catalyze the oxidation reaction of dinitrogen to glutamate.

The correct answer is:

(a) Both (A) and (R) are true, (R) is the correct explanation of (A).

(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(c) (A) is true but (R) is false.

(d) (A) is false but (R) is true.

TS EAMCET-08.05.2019 Shift-II

Ans. (c) : Assertion is true but Reason is false because glutamine synthetase enzyme is responsible for catalyzing the reaction that synthesizes glutamine from glutamate and ammonia. Enzyme nitrogenase catalyses the nitrogen fixation i.e. conversion of dinitrogen into ammonia.

163. Thiobacillus is a group of bacteria helpful in carrying out

(a) Chemoautotrophic fixation

(b) Nitrification

(c) Denitrification

(d) Nitrogen fixation

NEET-2019

Ans. (c) : Thiobacillus bacteria carries out denitrification process during nitrogen cycle. It reduces into free nitrogen.

- Nitrosomonas and Nitrobacter are chemoautotrophs that cause nitrification.
- Nitrogen fixing bacteria include species of Azotobacter, Bacillus, Clostridium, and Klebsiella.
- Nitrogen gas (N_2) is the ultimate end product of denitrification but other intermediate gaseous forms of nitrogen exist.

$$NO_3^- \rightarrow NO_2^- \rightarrow NO + N_2O \rightarrow N_2$$

$$2NO_3^- + 10e^- + 12H^+ \rightarrow N_2 + 6H_2O$$

- It is important to remove fixed nitrogen from the ecosystem and returns it to the atmosphere in a biologically inert form i.e N_2.

164. A Farmer has applied chemical fertilisers in his crop field for many successive seasons. In the next season, the crop growth was poor as soil lost its fertility. Suggest the suitable micro-organism that replenishes the fertility of soil in his field.

(a) Nostoc (b) Spirogyra

(c) Spirulina (d) Chlorella

Karnataka CET-2019

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Ans. (a) : Blue green algae (Cyanobacteria) such as Nostoc, Anabaena, Oscillatoria, Aulosira (used in rice field) Cylindrospermum (used in maize and sugarcane field) are very good at fixing nitrogen in the soil.

165. One of the following is involved denitrification reactions:
(a) Nitrosomonas (b) Nitrobacter
(c) Thiobacillus (d) Rhodospirillum

AP EAMCET-2000
NEET (Odisha)-2019

Ans. (c) : Denitrification is an anaerobic process and occurs in absence of oxygen. This is conversion of Nitrate (NO_3^-) into dinitrogen (N_2 gas) occurs by the help of *Thiobacillus* bacterium, which are also known as "denitrifying organisms". These are 2 types of denitrifying bacteria :
Heterotrophs (*Pseudomonas denitrificans*)
Autotrophs (*Thiobacillus denitrificans*)
- Thiobacillus is gram negative Betaproteobacteria.
- Thiobacillus oxidizes sulphur compounds to reduction of oxidized nitrogen compounds to dinitrogen.
- It is also helps in environmental remediation for nitrate removal

166. The process of converting nitrogenous compounds to ammonia is called
(a) nitrification (b) ammonification
(c) denitrification (d) nitrate reduction

Tripura JEE-2019

Ans. (b) : Process of converting nitrogenous compounds to Ammonia is known as "Ammonification".
- Proteins of dead decay of animals and plants are breaked into amino acid known as Deamination and then into ammonia compounds called Ammonification.

167. Which of the following plants do not contain the N_2 - fixing cyanobacteria
(a) Azolla (b) Cycas
(c) Anthoceros (d) Gnetum

Tripura JEE-2018

Ans. (d) : N_2 fixing cyanobacteria are found in association with coralloid roots of cycas (Gymnaspermous plant)
- Azolla are aquatic fern found in symbiotic association with Anabaena [Blue green Algae), which is free living Blue green algae, helps in nitrogen fixation and of anthoceros (Bryophyta)
- Gnetum is not found associated with cyanobacteria.

168. The enzyme nitrogenase responsible for N_2 - fixation contain
(a) only iron
(b) only chromium
(c) both iron and molybdenum
(d) both nickel and chromium

Tripura JEE-2018

Ans. (c) : Nitrogen fixation is performed by Nitrogenase enzyme which contains both irons and molybdenum.
The structure of Nitrogenase enzyme comprises Mo. Fe Protein heterotetron Nitrogenase enzyme if of 3 types – Molybdenum, vanadium iron nitrogenase.
It is a complex that compsises metalloprotein of Mo. Fe protein and Nitrogenase reductase Fe protein.

169. Which of the following is nitrogen fixing algae
(a) Nostoc, Anabaena, Oscillatoria
(b) Azolla, Anabaena , Azotobacter
(c) Oscillatoria, Anabaena, Azolla
(d) Azolla, Nostoc, Oscillatoria

AIIMS-26.05.2018 Shift-I

Ans. (a) : Nostoc, Anabaena, and Oscillatoria are nitrogen fixing algae. All these are blue-green algae of group prokaryotes. Now days, blue-green algae are called as Cyanobacteria. They are capable for fixing atmospheric nitrogen as free-living forms and also in mutual association with the roots of plant.

170. Free living N_2 fixation bacteria:
(a) Anabaena, Azotobacter, Frankia
(b) Rhizobium, Azotobacter, Rhodospirllum
(c) Beijernickia, Azotobacter, Clostridium
(d) Nostoc, Frankia, Bacillus

AIIMS-27.05.2018 Shift-I

Ans. (c) : Azotobacter, Beijernickia (aerobic) and Clostridium (anaerobic) are saprophytic bacteria that perform nitrogen fixation. Nitrogen fixing bacteria are convert atmospheric nitrogen into inorganic compounds that can be used by plants. They are of two types -
Free living and symbiotic bacteria

171. Select the correct answer
(a) Absorbed Nitrogen is accumulated by the plants in the form of Ammonium ions
(b) In free living conditions nitrogenase is not operational in Rhizobium
(c) Nodules of soyabean export the fixed nitrogen as amides
(d) Amino group of Aspartic acid is replaced by hydroxyl group to form asparagine

AP EAMCET-25.04.2018 Shift-II

Ans. (b) : Rhizobium is a rod shaped symbiotic, aerobic, nitrogen fixing bacterium present in the root nodules of leguminous plants. It performs symbiotic nitrogen fixation in the root nodules of leguminous plants in presence of an enzyme nitrogenase.
Ureides (degraded urea) are employed as a means of nitrogen transport from the nodules of some legumes (Example - Soybean).

172. Most famous nitrogen fixing bacterium / biofertilizer is
(a) Nitrobacter (b) Nitrosomonas
(c) Nitrococcus (d) Rhizobium

SRM JEEE-2018

Ans. (d) : Rhizobium is the most famous nitrogen fixing bacterium/biofertilizer. It is genus of bacteria associated with the formation of root nodules on plants. These bacteria live in symbiosis with legumes. Rhizobium affects on plant growth stimulation, host defence against disease and survival under stress.

173. In paddy fields biological nitrogen fixation is chiefly brought by
(a) Cyanobacteria (b) Green algae
(c) Mycorrhiza (d) Rhizobium

Rajasthan PMT-2011
SRM JEEE -2017

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Ans. (a) : In paddy fields, especially of Rice, biological nitrogen fixation is brought by cyanobacteria or Blue Green Algae.

- In cyanobacteria, there is a specialized structure known as Heterocysts which are the sites of N_2 fixation.
- Heterocysts lacks oxygen evolving photosystem II.
- Walls of heterocysts contains O_2 binding glycolipid which maintains anaerobic condition necessary for N_2 fixation.

174. Find out number of protons, electrons, and ATP molecules required and no. of ADP molecules released for the formation of 136 Ammonia molecules by symbotic N_2 fixation, based on the equation given below.

$68N_2 + \square H^+ + \square e^- + \square ATP \rightarrow 136NH_3 + 68H_2 + \square ADP$

(a) 272, 544, 1088, 544
(b) 544, 544, 1088, 1088
(c) 544, 272, 544, 1088
(d) 1088, 1088, 544, 544

AP EAMCET-28.04.2017 Shift-I

Ans. (b) : $68N_2 + 544\ H^+ + 544e^- + 1088ATP \rightarrow 136NH_3 + 68H_2 + 1088\ ADP$

175. In Aulosira, Tolypothrix and Nostoc,____are the sites for Nitrogen fixation.

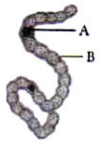
(a) Vesicles (b) Arbuscles
(c) Akinetes (d) Heterocysts

MHT CET-2017

Ans. (d) : Heterocyst present in Nostoc is specialized cell for Nitrogen Fixation. Cyanobacteria like Nostoc can fix nitrogen through a specific structure called **heterocyst**.

- Heterocyst are nitrogen-fixing cells generated by certain filamentous cyanobacteria, such as *Nostoc punctiforme, cylindrospermum stangale, Aulosira*, *Tolypothrix*, and *Anabaena sphaerica*, under nitrogen shortage.

176. Identify the labeled part in the given figure and select the correct option.



(a) A-Heterocyst; B-Mucilaginous sheath
(b) A-Mucilaginous; B-Heterocyst
(c) A-Heterocyst; B-Capsid
(d) A-Pseudopodia; B-Mucilaginous sheath

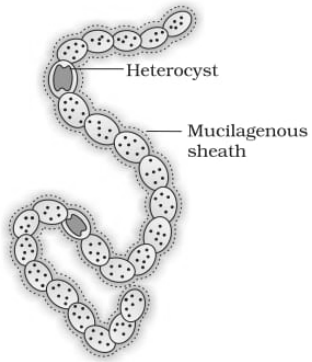
AIIMS-2017, 2016

Ans. (a) : Nostoc is a cyanobacteria. It has ability to fix atmospheric nitrogen. It converts nitrogen into ammonia. The **heterocysts** present in it are specialized for nitrogen fixation. It contains enzyme nitrogenase.

- Nitrogenase is inactivated by oxygen. Hence, the heterocyst must creates a micro anaerobic environment.

Mucilaginous sheath -

- It is also called the **slime layer.** It comprises the cellulose fibers aligned reticulately with in the matrix.
- In cyanobacteria, the cell wall is present in between the plasmalemma and mucilaginous sheath.



177. Nif genes occur in

(a) Rhizobium (b) Aspergillus
(c) Penicillium (d) Streptococcus

UP CPMT-2004
MHT CET-2017
WB JEE-2007

Ans. (a) : Nif genes occurs in Rhizobium sp. In leguminous plants, nitrogen fixation is done by nitrogenase enzyme complex. The Nif genes are found in both free living nitrogen-fixing bacteria and symbiotic bacteria.

The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversion of atmospheric nitrogen to ammonia, the first stable product of nitrogen fixation.

178. Nitrite is converted to nitrate by

(a) Nitrosomonas (b) Nitrobacter
(c) Pseudomonas (d) Clostridium

JCECE-2008
UP CPMT-2007

Ans. (b) : Nitrite is converted to nitrate by nitrobacter bacterium

- In nitrogen cycle, nitrogen is converted to nitrite with the help of Nitrosomonas bacteria while nitrite into nitrate is transformed by nitrobacter bacterium.
- It is a process that converts ammonia to nitrite then nitrate is known as "Nitrification".
- It is an aerobic process and oxidative process.
- *Nitrobacter, Nitrococcus* are known as "Nitrifying Bacteria" or "Chemoautotrophic Bacteria".

179. Which of the following pair of bacteria is involved in two step conversion of NH_3 into nitrate?

(a) Azotobacter and Nitrosomonas
(b) Nitrosomonas and Nitrobacter
(c) Azotobacter and Achromobacter
(d) Pseudomonas and Nitrobacter

UP CPMT-2004
MGIMS Wardha-2013

Ans. (b) : Nitrosomonas and Nitrobacter are the bacteria involved in two step conversion of NH_3 into nitrate. Nitrosomonas converts nitrogen gas into nitrite.

- The conversion of Nitrite to Nitrate is done by the nitrobacter bacterium.
- The whole process is known as Nitrification process.
- It is an aerobic and oxidation process.

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- The conversion of Ammonia from dead decaying matter is known as Ammonification.
- The whole N_2 metabolism involves
  - Ammonification
  - Nitrification
  - Denitrification
  - N_2 - Fixation
  - N_2 - Assimilation

180. Atmospheric N_2 fixation is carried on by
(a) Anabaena (b) Funaria
(c) Chlamydomonas (d) none of these
Punjab MET-1999

Ans. (a) : Atmospheric nitrogen fixation is carried by Anabaena
- Anabaena is a cyanobacteria which has specialized organ termed as "Heterocysts", In Nostoc and Anabaena the main site of Nitrogen fixation is 'Heterocysts'.
- Anabaena fix N_2 in specialized thick walled cells which lacks photosystem II are known as heterocysts.
- Heterocysts fixes N_2 only under anaerobic conditions.
- "Beijerinck" in 1901 carried out a discovery that prokaryotes i.e. cyanobacteria utilize enzyme Nitrogenase to catalyze the conversion of atmospheric Nitrogen to Ammonia.
- Conversion of atmospheric nitrogen to ammonia is a complex process, which involves many steps.

181. The element related with nitrogen metabolism is
(a) manganese (b) magnesium
(c) zinc (d) molybdenum
AMU-2015

Ans. (d) : Elements related with N_2 metabolism is Molybdenum because it is a main component of Nitrogenase enzyme complex.
- It also functions as a cofactor.
- Dinitrogenase protein of Nitrogenase enzyme contains Fe and Mo.
- Mo-Fe cofactor is the site of N_2 fixation.

182. Under anaerobic conditions, denitrifying bacterium Pseudomonas changes
(a) nitrate to molecular nitrogen
(b) nitrate to ammonia
(c) nitrate to nitrite
(d) nitrite to nitrate
BHU PMT (Mains)-2009

Ans. (a) : Under anaerobic condition, denitrifying bacterium Pseudomonas changes nitrate to molecular nitrogen and process is known as denitrification.
- It is anaerobic process i.e. occurs in absence of oxygen.
- There are 2 types of denitrifying organisms
  - Autotrophs
  - Hetrotrophs
- Autotrophic denitrifying organisms – *Thiobacillus denitrificans*
- Heterotrophic denitrifying organisms - *Paracoccus denitrificans* and *Pseudomonas denitrificans*

183. Nitrification is the process of conversion of
(a) NH_3 (b) NO_2
(c) NO_3 (d) All of these
DUMET-2008

Ans. (d) : Nitrification is the process of conversion of Ammonium ion (NH_4^+) into nitrite (NO_2^-) and then nitrite into nitrate (NO_3^-).
- Conversion of ammonium ion into nitrite is performed with the help of nitrifying bacteria Nitrosomonas, Nitrosococcus
$$2NH_3 + 3O_2 \xrightarrow[\text{Nitrosococcus}]{} 2HNO_2 + 2H_2O + \text{Energy}$$
- Conversion of Nitrite into nitrate is done by nitrobacter bacterium.
$$2HNO_2 + O_2 \xrightarrow{\text{Nitrobacter}} 2HNO_3 + \text{Energy}$$
- Nitrifying bacteria are chemoautotrophs i.e. obtains energy from oxidized inorganic substances.

184. The process of decay of dead organic matter is known as
(a) Denitrification (b) Nitrification
(c) Nitrogen fixation (d) Ammonification
BHU PMT (Screening)-2007

Ans. (d) : The process of decay of dead organic matter i.e. plants and animals is known as Ammonification.
- The process of ammonification of compounds is performed by *Bacillus mycides*, *B. ramosus, B. vulgaris*. These bacteria are also known as "Putrefying Bacteria".
- Proteins are breaked into amino acid process known as deamination and then into ammonia compound by bacteria through a process called Ammonification.

$$\text{Proteins from dead animals \& plants wastes} \xrightarrow[\text{decomposition}]{\text{microbial}} \text{Amino acid}$$

$$\text{Amino acid} \xrightarrow[\text{decomposition}]{\text{microbial}} \text{Ammonia}$$

185. Most plants obtain their nitrogen from the soil in the form of
(a) Nitric acid (b) Free nitrogen gas
(c) Nitrates (d) Nitrite
JandK CET-2015

Ans. (c) : Plants absorb Nitrogen from soil mainly in the form of nitrates (NO_3^-). In low concentration, ammonium ions can also be absorbed very easily.
- In high concentration, ammonium ions are very toxic
- The nitrogen in the form of nitrite (NO_2^-) not absorbed by plants. Hence they are oxidized into Nitrate (NO_3^-) by nitrifying bacter i.e. Nitrobacter.
$$2HNO_2 + O_2 \xrightarrow{\text{nitrobacter}} 2HNO_3 + \text{Energy}$$

186. In the higher plants, nitrate ions absorbed from the soil are converted to ammonia in two steps. In second step, the electrons required for reduction of nitrite ions are donated by
(a) cytochrome P_{450} (b) nitrate reductase
(c) ferredoxin (d) nitrite reductase
BHU PMT (Screening)-2011

Ans. (c) : In higher plants, nitrate ions absorbed from soil are converted to Ammonia in two steps :

$$\text{Amino acids} \xrightarrow[\text{decomposition}]{\text{microbial}} \text{Ammonia}[NH_3]$$

$$2NH_3 + 3O_2 \xrightarrow[\text{nitrosococcus}]{\text{nitrosomonas}} 2NHO_2 + 2H_2O + \text{Energy}$$

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$$2HNO_2 + O_2 \xrightarrow{\text{nitrobacter}} 2HNO_3 + \text{Energy}$$

- Nitrate is first reduced to nitrite before assimilated by plants.
- In second step, nitrite is reduced to ammonia by nitrate reductase
- Both these reactions are occur in cytosal and chloroplast respectively Nitrate Reductase is composed of 2 identical submits, containing FAD, then and Mo.

$$NO_3^- \xrightarrow[\text{Nitrate reductase}]{} NO_2^- \xrightarrow[\text{nitrate reductase}]{\text{ferredoxin}} NH_4^+$$

187. $N_2 + 8e^- + 8H^+ + 16ATP \rightarrow 2NH_4 + H_2 + 16ADP + 16Pi$

The above equation refers to

(a) ammonification (b) nitrification
(c) nitrogen fixation (d) denitrification
(e) reductive amination

VMMC-2015

Ans. (c) :

$N_2 + 8e^- + 8H^+ + 16ATP \rightarrow 2NH_4 + H_2 + 16ADP + 16Pi$

- This equation represents Nitrogen fixation.
- N_2 fixation is a process in which N_2 is fixed (converted) into ammonia then into nitrates. As plants, cannot directly use atmospheric N_2.
- N_2 fixation is of 2 types : Biological N_2 fixation and non Biological N_2 fixation
- Biological N_2 fixation can be either symbiotically or non-symbiotically
- N_2 fixation requires Mo-Fe as essential component and nitrate reductase enzyme also helps in N_2 fixation.

188. Enzyme nitrogenase is responsible for

(a) Nitrification (b) Nitrogen fixation
(c) Nitrite reduction (d) Nitrate reduction

JandK CET-2007

Ans. (b) : Enzyme Nitrogenase is responsible for N_2 fixation symbiotically or asymbiotically. It converts N_2 into NH_3. It acts as a catalyst and reduces activation energy.

189. Nitrogen is absorbed by plants in form of

(a) NO_3^- (b) NH_3
(c) NO_2^- (d) Both (a) and (c)

AFMC-2010

Ans. (d): Nitrogen is absorbed by plants in the form of Nitrites and Nitrate, Mostly in the form of nitrate (NO_3^-)

- Nitrate moves freely towards plant roots as they absorb water
- Nitrogen demand increases with their size
- The whole process of conversion of nitrite into nitrate and nitrate into dinitrogen gas (N_2) is known as Nitrification.

190. Non-symbiotic nitrogen fixation takes place by:

(a) Nostoc, Azotobacter, Clostridium
(b) Anabena, Nostoc, Rhizobium
(c) Azotobacter, Nitrosomonas, Rhizobium
(d) Anabena, Nitrosomonas, Pseudomonas

GUJCET-2014

Ans. (a) : The fixation of atmospheric N_2 by soil bacteria that are free-living is known as non-symbiotic N_2 fixation.
Nostoc is a free living cyanobacteria and azotobactor is obligate aerobic bacteria. Clostridium is anaerobic bacteria. These organisms live freely in the soil and fix the atmospheric nitrogen.

191. Nostoc fixed dinitrogen in symbiotic association with the following:

1. Alnus **2. Gunnera**
3. Anthoceros **4. Casuarina**

The correct combination is:

(a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) 1 and 4

AP EAMCET-2005

Ans. (b): Nostoc is a blue-green alga or Cyanobacteria. It is a filamentus and in most causes Clonial blue-green alga. It has symbiotic association with Anthoceros (bryophyte) or with *Gunnera manicata* (an angiospermic marsh plant).

- Nostoc and anabena is cyanobacteria. It is converts atmospheric nitrogen into ammonia.

192. Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism ?

(a) *Cicer arietinum*
(b) *Casuarina equisetifolia*
(c) *Crotalaria juncea*
(d) *Cycas revoluta*

AIPMT-2007

Ans. (b) : *Casuarina equisetifolia*, common names- Australian- pine tree beach she-oak, common ironwood. Plant absorb atmospheric Nitrogen in form of NO_3^-, NO_2^- and NH_4^+ ion. In root nodules of casuarina and Alnus filamentus frankia are present

193. Which of the following is responsible for biological nitrogen-fixation?

(a) Nif gene
(b) Nitrogenase
(c) yeast alanin tRNA synthetase
(d) RNA synthetase

JIPMER-2014

Ans. (a) : The nitrogen fixation enzymes are encoded by Nif genes that are present in both free living and are symbiotic nitrogen fixing bacteria. Root nodules primarily contain the enzyme nitrogenase.
It catalyzes the conversion of nitrogen to ammonia. This ammonia produced is used for the synthesis of amino acids and finally into proteins by joining several amino acids.

194. Which of the following is non-symbiotic nitrogen fixer organism?

(a) VAM (b) Azotobacter
(c) Anabaena (d) Rhizobium

JIPMER-2014

Ans. (b) : Only Azotobacter is a non-symbiotic free - living nitrogen - fixing bacteria. They are aerobic and can survive only if there is presence of oxygen. It helps in fixing nitrogen by converting atmospheric nitrogen to ammonia. Thus it is an example of non-symbiotic nitrogen fixing bacteria.

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195. The common nitrogen-fixer in paddy fields is –
(a) Rhizobium (b) Azospirillum
(c) Oscillatoria (d) Frankia

AIPMT (Screening)-2010

Ans. (b) : Azospirillum is a nitrogen fixing bacterium in paddy fields. It is very useful for soil and root bacterium and it is used as biofertilizer in Rice fields.
• Some other example of nitrogen fixer bacteria are - Azotobacter, Frankia, Rhizobium.

196. One of the free-living anaerobic nitrogen-fixer is
(a) Beijernickia (b) Rhodospirillum
(c) Rhizobium (d) Azotobacter

AIPMT (Screening)-2010

Ans. (b) : Rhodospirillum is a free living anaerobic nitrogen fixer bacteria also it can synthesize its food in presence of light under anaerobic condition.
• Rhizobium species from on endosymbiotic nitrogen fixing association with roots of legumes.
• Free living aerobic nitrogen fixers includes the cyanobacteria (Anabaena and Nostoc), Azotobacter, Beijerinckia and clostridium.

197. Which of the following is a symbiotic nitrogen fixer ?
(a) Azolla (b) Glomus
(c) Azotobacter (d) Frankia

AIPMT-2009

Ans. (d) : Frankia is a symbiotic nitrogen fixing bacteria. It induces root nodules just like *Rhizobium.* It is associated symbiotically with the root nodules of several **non-legume plants like Casuarinas, Alnus etc.** It cannot fix nitrogen in freestate.

198. What are the names of free living aerobic and anaerobic nitrogen fixation bacteria respectively?
(a) Rhizobium - Clostridium
(b) Azotobacter - Clostridium
(c) Azotobacter - Agrobacterium
(d) Agrobacterium - Clostridium

GUJCET-2016

Ans. (b) : Azotobacter and Clostridium are the free-living aerobic and anaerobic nitrogen-fixing bacteria respectively. N_2 fixing bacteria possess nitrogenase enzyme which helps them in N_2 fixation. These bacteria are either free living or in a symbiotic relationship with the roots of plants.

199. Which bacterium is responsible for oxidation of ammonia to nitrite in soil?
(a) Nitrobacter (b) Clostridium
(c) Nocardia (d) Nitrosomonas

UP CPMT-2013

Ans. (d) : Nitrosomonas is responsible for oxidation of ammonia to nitrite in soil.

$$NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O$$

200. Nodules which are present in leguminous plants are meant for fertilizers and are found in/on :
(a) certain leguminous plants
(b) aeschynomene
(c) Sesbania rostrata
(d) all of the above

Uttarakhand PMT-2006

Ans. (d) : Root nodules are commonly found in the root of leguminous plants. They are formed due to association with a nitrogen-fixing bacteria Rhizobium.

201. Which one of the following is an amide involved nitrogen assimilation by plants?
(a) Glutamate (b) Alanine
(c) Asparagine (d) Serine
(e) Glycine

Kerala PMT-2009

Ans. (c) : Nitrogen is absorbed by plants as nitrate ion. This nitrate is internally converted to ammonia ions through the plants enzymes nitrate reductase and nitrite reductase. The ammonia ions are then incorporated in amides like asparagines and glutamine.
• Asparagine is the primary assimilation product from N_2 fixation in temperature legumes and the predominant N_2 transport product in many plant species.

202. Which one of the following statements about nitrogenase is correct?
(a) It is sensitive to CO_2 and therefore present in isolated nodules.
(b) It requires O_2 and therefore functional during the day.
(c) It is sensitive to O_2 and therefore is functional in anaerobic environments
(d) It is sensitive to light and therefore functions only in dark.

KVPY SB and SX-2013

Ans. (c) : Enzymes required for N_2 fixation are Nitrogenase.
Enzyme nitrogenase is oxygen labile. Oxygen will make the enzyme irreversibly inactive. So, the nitrogen-fixing bacteria needs to protect the nitrogenase enzyme from oxygen.
Many Nitrogen-fixing bacteria grow in anaerobic conditions or respire to bring down O_2 levels.

203. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by :
(a) Cytochrome (b) Leghaemoglobin
(c) Xanthophyll (d) Carotene

AIPMT (Re-Exam)-2015

Ans. (b) : During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by leghaemoglobin.
Leghaemoglobin is red pigment filled outside the peribacteroid space in the cytosol of nodule cells.
It is similar to haemoglobin of red blood cells.
Biological nitrogen fixation occurs when atmospheric nitrogen is converted to ammonia by an enzyme called nitrogenase.

204. Which bacteria is utilized in Gober gas plant :
(a) Methanogens
(b) Nitrifying bacteria
(c) Ammonifying bacteria
(d) Denitrifying bacteria

AIPMT-2002

@apna_pdf

Ans. (a) : Methanogens bacteria utilized in the gobar gas plant. Methanogens are anaerobic, autotrophic eukaryote that converts CO_2 and H_2 into methane gas.

- Chemolithotrophic bacteria that reduce the organic nitrogen into ammonia are termed as ammonifying bacteria.
- The chemolithotrophic bacteria that convert ammonia NH_3 into No_3^- are termed as nitrifying bacteria; it includes **Nitrosomonas** and **Nitrobacter.**
- The chemolithotrophic bacteria that reduce the nitrates into nitrogen are termed as denitrifying bacteria.

Nitrifying, Ammonifying and Denitrifying bacteria are component of Nitrogen cycle. They do not play any role in gobar gas production.

205. Which of the following species does not have the ability to fix atmospheric nitrogen?

(a) Azotobactor (b) Anabaena
(c) Nostoc (d) Spirogyra

AIPMT-1994

Ans. (d) : The filamentous alga is genus *spirogyra*. Its name to the characteristic spiral shape of the chloroplasts possessed by it's members.

206. The enzyme responsible for atmospheric nitrogen fixation is :

(a) nitrogenase (b) hydrogenase
(c) oxygenase (d) carboxylase

JIPMER-2006

Ans. (a) : Nitrogenase is the key enzyme for biological nitrogen fixation. Nitrogenase is a Mo-Fe protein that helps in the conversion of nitrogen to ammonia.

$N_2+8e^-+8H^+ + 16ATP \rightarrow 2NH_3+H_2+16ADP$

207. The non-photosynthetic, non-symbiotic N_2 fixing bacteria are

(a) Rhodobacter (b) Spirillum
(c) Azotobacter (d) All of these

JIPMER-2005

Ans. (c) : Azotobacter is non-photosynthetic, non-symbiotic and aerobic nitrogen fixing bacteria. Plants cannot use atmospheric nitrogen directly. So, some bacteria that are present is environment convert atmospheric nitrogen into ammonia which is then able to be used by the plants.

208. Nitrifying bacteria are able to

(a) convert atmospheric nitrogen into soluble forms
(b) convert ammonia to nitrate
(c) ammonia to nitrogen
(d) nitrate to nitrogen

JIPMER-2008

Ans. (b) : Nitrifying bacteria convert the most reduced form of soil nitrogen, ammonia, into its most oxidized form, nitrate. In itself, this is important for soil ecosystem function, in controlling losses of soil nitrogen through leaching and denitrification of nitrate.

Nitrosomonas and Nitrobacter are the two examples of nitrifying bacteria.

$$NH_3 + O_2 + 2e^- \xrightarrow[\text{Monoxygenase}]{\text{Ammonia}} NH_2OH + H_2O$$

$$NH_2OH + H_2O \xrightarrow[\text{oxireductase}]{\text{hydroxylamine}} NO_2^- + 5H^+ + 4e^-$$

209. The function of leghaemoglobin during biological nitrogen fixation in root nodules of legumes is to

(a) Convert atmospheric N_2 to NH_3
(b) Convert ammonia to nitrite
(c) Transport oxygen for activity of nitrogenase
(d) Protect nitrogenase from oxygen

AIIMS-2006
JandK CET-2015

Ans. (d) : Leghaemoglobin is a **pink-coloured pigment** that is present in the root nodules of leguminous plants.

It combines with oxygen and protects nitrogenase, which catalyses the fixation of nitrogen under anaerobic conditions.

210. Leghaemoglobin is produced in response to

(a) respiration (b) photosynthesis
(c) fatty acid synthesis (d) N_2 fixation

AIIMS-2012

Ans. (d) : Leghaemoglobin has closed structural similarity with haemoglobin. It is also red in colour. Leghaemoglobin is an oxygen carrier and haemoprotein. Leghaemoglobin is produced by legumes in response to the roots being colonized by nitrogen-fixing bacteria, termed rhizobia, as part of symbiotic interaction between plant and bacterium.

211. Which cell in cyanobacteria performs nitrogen fixation?

(a) Heterocysts (b) Akanite
(c) Filament (d) Nodule

MHT CET-2010

Ans. (a) : Heterocyst is a transparent thick walled empty cell which is present in intermediate position in filaments of blue green algae (cyanobacteria). They are the site of nitrogen fixation.

212. Which one of the following can utilize molecular nitrogen (N_2) as nutrient for growth?

(a) Rhizobium (b) Spirogyra
(c) Mucor (d) Methanococcus

CG PMT-2005

Ans. (a) : Rhizobium is a bacterium found in soil that helps in fixing nitrogen in leguminous plants. It attaches to the roots of the leguminous plant and produce nodules. These nodules fix atmospheric nitrogen and convert it into ammonia that can be used by the plant for its growth and development.

213. During symbiotic nitrogen fixation, how many moles of ATP are used in fixing one mole of N_2?

(a) 8 (b) 16
(c) 5 (d) 10

BCECE-2015

Ans. (b) :

$N_2 + 8e^- + 8H^+ + 16\ ATP \rightarrow 2NH_3 + H_2 + 16\ ADP + 16Pi$

Thus, one mole of nitrogen is converted into two molecules of ammonia by the use of 16 ATPs.

214. Actinomycetes which is a symbiotic nitrogen fixing organism in many plants:

(a) Streptomyces (b) Anabaena
(c) Frankia (d) Rhizobium

DUMET-2006

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Ans. (c) : Frankia is a nitrogen fixing multicellular actinomycete which establishes root nodule symbiosis with actinorhizal plants.

215. The nitrogen fixed in the nodules of *Glycine max* is exported to other parts of the plant as

(a) Nitrates (b) Ammonia
(c) Ureides (d) Aspargine

TS EAMCET-15.05.2016

Ans. (c) : In *Glycine max*, ammonia formed as a product of nitrogen fixation is converted to ureides and transported to the other parts of the plant.
Glycine max is a botanical name of soyabean plant.

216. Which of the following is considered to be the best chemical method of fixing atmospheric nitrogen ?

(a) Fisher method
(b) Decan method
(c) Haber-Bosch method
(d) Parnas-Meyerhof method

BVP-2007 /Manipal-2008 / BHU PMT-2004

Ans. (c) : Haber-Bosch method is used for manufacturing ammonia from atmospheric nitrogen.
$N_2 + 3H_2 \rightleftharpoons 2NH_3$. This reaction is exothermic and reversible in nature.

217. Azotobacter and Beijernickia are the examples of

(a) Symbiotic nitrogen- fixers
(b) Non-symbiotic nitrogen- fixers
(c) Ammonifying bacteria
(d) Disease causing bacteria

BHU PMT (Mains)-2007

Ans. (b) : Azotobacter and Beijernickia are the examples of non-symbiotic nitrogen-fixers. They are able to convert atmospheric nitrogen to ammonia.

218. The bacterium capable of anaerobic N_2 fixation is known as

(a) Clostridium (b) Bacillus
(c) Azotobacter (d) Rhizobium

CG PMT-2004 / AMU-1998

Ans. (a) : *Clostridium botulinum* are capable of nitrogen fixation and are an anaerobic bacterium. They are saprophytic bacteria that grows in conditions that are devoid of oxygen.

219. Nif genes are fixing genes for

(a) Nitrogen (b) Oxygen
(c) Carbon (d) Nitrate

CMC Vellore-2011

Ans. (a) : The nif genes are genes encoding enzymes involved in the fixation of atmospheric nitrogen. Nif genes are found into living organism i.e. nitrogen fixing bacteria and cyanobacteria.

220. Nitrates are converted into N_2 by

(a) N_2 fixing bacteria
(b) sulphur fixing bacteria
(c) denitrifying bacteria
(d) none of these

VMMC-2004
CG PMT-2004

Ans. (c) : Denitrifying bacteria are a diverse group of bacteria that encompass many different phyla whose action results in the conversion of nitrates in the soil to free atmospheric nitrogen.

221. Nitrogen fixation means:

(a) N_2 changes in NO_3^-
(b) N_2 changes in NH_3
(c) NO_2^- changes into nitrates
(d) none of these

VMMC-2004

Ans. (b) : The fixation of atmospheric nitrogen into ammonia by living organisms is called biological nitrogen fixation. In this process N_2 (di-nitrogen) changes in NH_3 (ammonia)

222. The aquatic fern, which is an excellent biofertilizer is :

(a) Azolla (b) Salvinia
(c) Marsilea (d) Pteridium

Haryana PMT-2000

Ans. (a) : Azolla is a pteridophyte or aquatic plant float on the surface of water and used as a biofertilizer because it has association with nitrogen fixing cyanobacteria.

223. Which of the following gene is responsible for biological nitrogen fixation ?

(a) Nitrogenase
(b) Nif gene
(c) Yeast alanine t – RNA synthetase
(d) RNA synthetase

Punjab MET-2005

Ans. (b) : The nif genes are genes involved in nitrogen fixation. They are found in nitrogen fixing bacteria

224. Free living nitrogen fixing aerobic bacterium is

(a) Rhodospirillum (b) Anabaena
(c) Nostoc (d) Beijernickia
(e) Rhizobium

Kerala PMT-2014

Ans. (d) : Beijerinckia is a free living nitrogen-fixing aerobic microbe. It has aboundant of nitrogenase enzyme capable of nitrogen reduction.

225. Match the items in column I with those in column II and choose the correct answer.

Column I		Column II	
A.	**Thiobacillus**	**1.**	**Nitrogen-fixation**
B.	**Nitrosomonas**	**2.**	**Ammonification**
C.	**Azotobacter**	**3.**	**Nitrification**
D.	**Pseudomonas**	**4.**	**Denitrification**

(a) A-4B-3C-1D-2 (b) A-3B-4C-1D-2
(c) A-4B-2C-1D-3 (d) A-2B-1C-3D-4

WB JEE-2015

Ans. (a) :

Column-I	Column-II
Thiobacillus	Denitrification
Nitrosomonas	Nitrificaiton
Azotobacter	Nitrogen-fixation
Pseudomonas	Ammonificaiton

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226. Match the items in Column I with Column II and choose the correct answer.

Column I		Column II	
a.	Free living aerobic nitrogen fixers	i.	Anabaena and Nostoc
b.	Anaerobic nitrogen fixers	ii.	Pseudomonas and Thiobacillus
c.	Nitrogen fixing cyano-bacteria	iii.	Nitrosomonas and Nitrococcus
d.	Denitrifying bacteria	iv.	Azotobacter and Beijernickia
e.	Nitrifying bacteria	v.	Rhodospirillum

(a) a – 4, b – 5, c – 1, d – 2, e – 3
(b) a – 5, b – 4, c – 1, d – 3, e – 2
(c) a – 4, b – 5, c – 2, d – 3, e – 1
(d) a – 4, b – 3, c – 1, d – 2, e – 5
(e) a – 4, b – 5, c – 3, d – 2, e – 1

Kerala PMT-2013

Ans. (a) : Free living aerobic Nitrogen fixer bacteria are Azotobacter and Beijernickia.
- Anaerobic nitrogen fixing bacteria is Rhodospirinllum.
- Nitrifying bacteria are Nitrosomonas and Nitrosococcus.
- Denitrifying bacteria are Pseudomonas and Thiobacillus.
- Nitrogen fixing cyanobacteria are Anabacena and Nostoc.

227. Certain bacteria living in the soil poor in oxygen, convert nitrates into nitrites and then to free nitrogen and such bacteria are termed as
(a) nitrogen fixing bacteria
(b) denitrifying bacteria
(c) ammonifying bacteria
(d) saprophytic bacteria

AFMC -2009, 2006

Ans. (b) : Denitrifying bacteria are present in soil and convert nitrate and ammonia into atmospheric free elemental N_2 such process is known as Denitrification. These bacteria grow very well in soil where water is more and oxygen is low.
- Denitrifying bacteria uses nitrates instead of O_2 as an electron acceptor during respiration e.g. Thiobacillus denitrificans.

228. Nitrifying bacteria are
(a) autotrophs (b) chemoautotrophs
(c) heterotrophs (d) phototrophs

UP CPMT-2012

Ans. (b) : Nitrifying bacteria are chemoautotrophic organisms that includes nitrosomonas, Nitrosococcus, Nitrobacter.
- These bacteria get their energy from oxidation of N_2 compounds
- These bacteria are of 2-types (i) ammonia oxidizing bacteria [AOB]
  (ii) nitrite oxidizing bacteria [NOB]
- These bacteria converts most reduced form of soil nitrogen, ammonia into oxidized form i.e. nitrate.

229. A bacterium which fixes atmospheric nitrogen in non-leguminous plant is:
(a) Azotobacter (b) Rhizopus
(c) Azospirillum (d) E. coli

VMMC-2006

Ans. (c) : Bacterium fixes atmospheric nitrogen in non-leguminous plant is Azospirillum. It is a gram negative aerobe. That is rod shaped and has a polar flagellum. It increases yields of cereals by fixing Nitrogen. It synthesizes phytohormones like IAA or Auxin and supposed to increase biotic and abiotic stress tolerance. Azospirillum appear to colonize crop plants as well as weeds, and are also found in caves of marine mangroves.

230. The source of energy for non-biological nitrogen fixation is:
(a) By ionizing events such as lightning and effect of cosmic rays
(b) Ferredoxin enzyme and nitrogenase
(c) By reduction of proteins to ammonia
(d) By oxidation of ammonia to protein

Karnataka CET-2003

Ans. (a) : Source of energy for non biological nitrogen fixation is by ionizing agents such as lightning and effect of cosmic rays
- Due to thunder storm or lightening atmospheric N_2 combines with oxygen to form nitric oxide (NO), which finally oxidized to nitrogen dioxide (NO_2) which reacts with sum water in presence of oxygen to form nitric acid. This nitric acid comes to earth, reacts with substances of soil and form nitrates (the source of N. m plants.)

Step (i) $N_2 + O_3 \xrightarrow[\text{lightening}]{} 2NO_3$
Nitric oxide

Step (ii) $2NO + O_2 \longrightarrow 2NO_2$
Nitrogen peroxide

Step (iii) $H_2O + 3NO_2 \longrightarrow 2HNO_3 + NO$
Nitric acid

Step (iv) $HNO_3 + NH_3 \longrightarrow NH_4NO_3$
Ammonium nitrate

Reactions of Non-Biological Nitrogen fixation

231. The odd one among following is
(a) Nitrococcus, Nitrobacter, Nitrosomonas
(b) Rhizobium, Aulosira, Bacillus, Polymyxa
(c) Clostridium, Rhizobium, Nostoc
(d) Anabaena, Nastoc, Azotobacter, Clostridium

BHU PMT (Screening)-2011

Ans. (b) : Bacteria is related to nitrogen fixation, nitrification and denitrification. Only Rhizobium is associated with N_2 fixation.

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232. Nostoc fixes dinitrogen in symbiotic association with the following

I. Alnus **II. Gunnera**
III. Anthoceros **IV. Casuarina**
The correct combination is

(a) I and II (b) II and III
(c) I and III (d) I and IV

VMMC-2010

Ans. (b) : Gunnera develops a complex and symbiosis with N_2 fixing cyanobacteria of Nostoc. Nostoc–Gunnera symbiosis exhibits unique feature i.e. cyanobacterium infects specialized glands located on the stems of the host and once it has passed into interior of the gland. Nostoc also enters Gunnera cells and begins to differentiate highest frequency of heterocysts which is necessary for N_2 fixation in Nostoc (BGA).

• *Nostoc-Anthoceros* relationship is also example of symbiosis. *Anthoceros* is also known as "Hornwort".

233. The unique property of legumes, is the assimilation of nitrogen in the form of:

(a) molecular nitrogen (b) ammonia
(c) nitrates (d) organic nitrogen

AP EAMCET-1997

Ans. (b) : In legumes and other plants, bacteria lives symbiotically in roots and forms nodules called Root nodules. Within this nodule, N_2 fixation occurs and Ammonia (NH_3) is produced and absorbed by plants.

• N_2 assimilation requires reduction of nitrates to ammonium and then ammonium assimilation into amino acid by GS–GOGAT pathway [Glutamine Synthetase–Glutamine 2 oxoglutarate amino transferase).

234. Which one depicts nitrogen fixation ?

(a) $N_2 \rightarrow NH_3$ (b) $N_2 \rightarrow NO_3$
(c) $N_2 \rightarrow$ Amino acids (d) Both (a) and (b)

VMMC-2008 / AMU-2008 / HP CET-2012

Ans. (d) : Nitrogen fixation is a process of conversion of atmospheric Nitrogen into Ammonia and represented as –

$$N_2 + 3H_2 \xrightarrow{16ATP} \underset{\text{Ammonia}}{2NH_3}$$

$$2NH_3 + 3O_2 \longrightarrow 2NO_2^- + 2H^+ + 2H_2O$$

$$2NO_2^- + O_2 \longrightarrow 2NO_3^-$$

Ammonia is first oxidized to nitrite by the bacteria nitrosomonas or nitrococcus. The nitrite is further oxidized to nitrate with the help of the bacterium nitrobacter.

235. Root of which plant contains a red pigment that has affinity for oxygen?

(a) Carrot (b) Soyabean
(c) Mustard (d) Radish

CG PMT-2011

Ans. (b) : Legumes or Soyabean plant contains a red pigment or pink pigment like Haemoglobin called "Leghaemoglobin (LHb)". It is red in colour due to presence of iron, first isolated and crystallized from soyabean roots. It regulates oxygen concentration as bacteroids are aerobic and consume oxygen. LHb promotes oxygen utilization in bacteroids and favours N_2 fixation. It facilitates the movement of oxygen to O_2 deficient tissues. Leg Hb combines with oxygen to form Oxyleghaemoglobin. OLHb maintains O_2 tensed environment and allow nitrogenase to function properly.

236. Nitrites converted to nitrates by

(a) Nitrobacter bacteria (b) Nitrocystis bacteria
(c) Pseudomonas bacteria (d) Both (a) and (b)

CMC Ludhiana -2013

Ans. (d) : Nitrites converted into nitrate by nitrifying bacteria eg. Nitrobacter and Nitrocystis bacteria process known as "Nitrification". In this process, there are two steps.

- In the first step, ammonium ion is converted into nitrite.
- In the second step, nitrite ion is converted into nitrate.

e.g. Nitrobacter, Nitrococcus, Nitrospira, Nitrosomonas.

237. The major chunk of nitrogen in nature is fixed by

(a) Lightning (b) Symbiotic bacteria
(c) Denitrifying bacteria (d) Chemical industries

Haryana PMT-2011

Ans. (b) : Major chunk of N_2 fixation is by Symbiotic Bacteria, i.e. Rhizobium sp. It forms root nodules in leguminous plants with the help of Nitrogenase enzyme and nitrate reductase enzyme.

• The genes required for nitrogen fixation is Nif gene i.e. Nitrogen fixing gene and fix gene i.e. fixatory gene which regulates activity of nif genes.

A symbiotic relationship is a type in which both partners gets benefitted and is called mutualism.

H. Nodule Formation and fate of Ammonia

238. Nodules with nitrogen fixing bacteria present in roots of

(a) cotton (b) gram
(c) wheat (d) maize

CG PMT-2007 / VMMC-2008
AMU-2008 / Manipal-2002

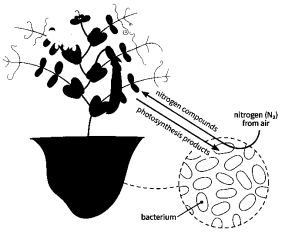
Ans. (b) : The nitrogen fixing bacteria are found in the roots of legumes in special structures called root nodules. Nodules with nitrogen fixing bacteria present in roots of gram.

239. In root nodules of legumes, leg-haemoglobin is important because

(a) it transports oxygen to the root ule
(b) it acts as an oxygen scavenger
(c) it provides energy to the nitrogen fixing bacterium
(d) it acts as a catalyst in transamination

DUMET-2009/ Rajasthan PMT-2011
CMC Ludhiana-2014 / AIIMS-2007,2014 /
DUMET-2011

Ans. (b) :



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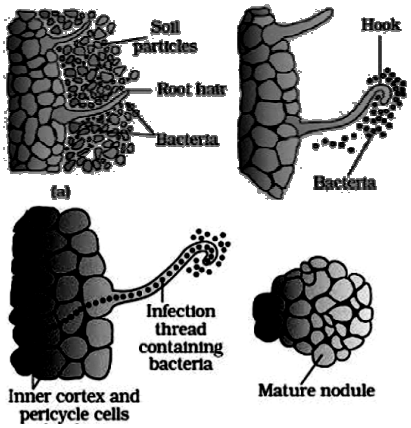

In root nodules of legumes, leghaemoglobin is important because it acts as an oxygen scavenger. Leghaemoglobin combines with oxygen to form oxyleghaemoglobin. Oxyleghaemoglobin maintains O_2 anaerobic condition necessary for the activity of Nitrogenase enzyme complex. Hence, Leghaemoglobin acts as oxygen scavenger and makes environment anaerobic.

240. Which of the following protects nitrogenase inside the root nodule of a leguminous plant?

(a) Catalase
(b) leg haemoglobin
(c) Transaminase
(d) Glutamate dehydrogenase

NEET (Re-Exam)-04.09.2022

Ans. (b) : The leghaemoglobin is responsible for creating anaerobic conditions in the root nodules of the legume plant. It acts as oxygen scavenger and protects enzyme nitrogenase from oxygen and help in proper functioning of the enzyme.

241. The treatment with ___induces nodule formation in the roots of leguminous plants

(a) Zeatin
(b) Indole-3-acetic acid
(c) Ethylene
(d) Abscisic acid

AP EAMCET-11.07.2022 Shift-II

Ans. (b) : Treatment with Indole-3-acetic acid induces nodule formation in the roots of leguminous plants. Indole-3-acetic acid (IAA) is an auxin plant hormone produced by terrestrial plants which altered cell orientation, organ development, fertility and cell-elongation.

242. Match List - I with List - II:

List-I		List-II	
A.	Porins	i.	Pink coloured nodules
B.	leg haemoglobin	ii.	Lumen of thylakoid
C.	H^+ accumulation	iii.	Amphibolic pathway
D.	Respiration	iv.	Huge pores in outer membrane of mitochondria

Choose the correct answer from the options given below:

(a) (A) - (ii), (B) - (i), (C) - (iv), (D) - (iii)
(b) (A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)
(c) (A) - (iii), (B) - (iv), (C) - (ii), (D) - (i)
(d) (A) - (ii), (B) - (iv), (C) - (i), (D) - (iii)

NEET (Re-Exam)-04.09.2022

Ans. (b) : In the outer membranes of plastids, mitochondria and some bacteria porins are present. They allow molecules, upto size of small proteins to pass through.

- The root nodules of leguminous plants contain the enzyme nitrogenase and a pink-coloured pigment leghaemoglobin.
- Protons accumulate inside the lumen of thylakoids due to splitting of water. Water splitting complex is associated with PS-II and is located on the inner side of the thylakoid membrane (facing the lumen of thylakoids)

- An amphibolic pathway is a biochemical pathway that includes both anabolic and catabolic processes.
- This process of synthesis is termed as anabolism. Thus we can say respiration is the sum process of catabolism and anabolism products of the Krebs cycle and glycolysis act as a precursor. For the synthesis of fats, proteins etc. Hence, the respiratory pathway is known as an amphibolic pathway.

243. The product(s) of reaction catalyzed by nitrogenase in root nodules of leguminous plants is/are

(a) Nitrate alone
(b) Ammonia and oxygen
(c) Ammonia and hydrogen
(d) Ammonia alone

NEET-2020 Phase-I

Ans. (c) : Nitrogenase enzyme cataylses the nitrogen fixation in root nodules of leguminous plants. The reaction is as follows.

$$N_2 + 8e^- + 8H^+ + 16ATP \longrightarrow 2NH_3 + H_2 + 16ADP + 16Pi$$

So, Products of nitrogen fixation are both ammonia and hydrogen.

244. In Glycine max, the product of biological nitrogen fixation is transported from the root nodules to other parts as

(a) Ureides (b) Ammonia
(c) Glutamate (d) Nitrates

NEET-2020 Phase-II

Ans. (a) : The nodules of some plants (e.g., soyabean) export the fixed nitrogen as ureides. The ureides are translocated to the various plant parts as a source of Nitrogen.

- Ureides are nitrogenous compounds derived from purine catabolism which contribute to nitrogen recycling in plants.

245. Rhizobium forms symbiotic association with roots in legumes and fixes atmospheric nitrogen. Which one of the following statement is correct about this process?

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(a) Activity of nitrogenase is sensitive to oxygen
(b) Activity of nitrogenase is insensitive to oxygen
(c) Anaerobic conditions allow ATP independent conversion of nitrogen to ammonia
(d) Under aerobic conditions, atmospheric nitrogen can be converted to nitrates by Rhizobium

KVPY SB and SX-2019

Ans. (a) : Rhizobium forms symbiotic association with root nodules of legumes and nitrogenase is the main enzyme responsible for N_2 fixation is sensitive to oxygen. Nitrogenase converts atmospheric Nitrogen to Ammonia. Nitrogenase requires anaerobic condition for its activity which is fulfilled by pink coloured pigment called Leghaemoglobin. Leghaemoglobin maintains anaerobic condition for Nitrogenase.

246. Which of the following scientist first showed mutually beneficial relationship between bacteria and leguminous plants?
(a) Hellriegel and Wilfarth
(b) Nocard and Roux
(c) Winogradsky and Beijerinck
(d) Welch and Nuttall

SRM JEEE-2018

Ans. (c) : Winogradsky and Martinus Beijerinck first showed mutually beneficial relationship between bacteria and leguminous plants.
• Beijerinck discovered new types of bacteria from soil and described biological nitrogen fixation. He is called as the father of virology.
• Winogradsky was a Russian microbiologist, ecologist and soil scientist who discovered the biological process of nitrification.

247. Identify incorrect statement
(a) Free living Rhizobia are aerobes and have Nitrogenase in inactive state
(b) Nodules have direct vascular connection with the host and possess enzyme Nitrogenase and Leghaemoglobin
(c) Nitrogenase reduces N_2 to Ammonia under aerobic conditions
(d) Soyabean export the fixed nitrogen as ureides, which have high nitrogen to carbon ratio

AP EAMCET-28.04.2017 Shift-II

Ans. (c) : The nodule contains all the necessary biochemical components, such as the enzyme nitrogenase and leghaemoglobin. The enzyme nitrogenase is a Mo-Fe protein and catalyses the conversation of atmospheric nitrogen to ammonia. It is first stable product of nitrogen fixation. The enzyme nitrogenase is highly sensitive to the molecular oxygen. It requires anaerobic condition.

248. Select the mismatch:
(a) Frankia - Alnus
(b) Rhodospirillum - Mycorrhiza
(c) Anabaena - Nitrogen Fixer
(d) Rhizobium - Alfalfa

NEET-2017

Ans. (b) : Rhodospirillum is anaerobic, free living nitrogen fixer which help in the conversion of atmospheric nitrogen into Ammonia. It is not associated with roots of the vascular plant as mycorrhiza.
• Mycorrhiza is a symbiotic relationship between fungi and roots of higher plants (algae).

249. The first stable product of fixation of atmospheric nitrogen in leguminous plant is
(a) NO_2^- (b) Ammonia
(c) NO_3^- (d) Glutamate

JIPMER-2017
NEET-2013

Ans. (b) : Ammonia is the first stable product of fixation of atomospheric nitrogen in leguminous plants. this is catalysed by nitrogenase enzyme.

250. Identify the role of lectins in the formation of root nodules in legumes.
(a) Formation of shephered's crook
(b) Recognition of compatible Rhizobium by host
(c) Formation of peribacteroid membrane
(d) Formation of infection thread

AP EAMCET-2013

Ans. (b) : In the plant lecting of a given species can interact with polysaccharides of only a particular plant. Lecting is participates in plant defence against predators and pathogen. It is participates in symbiotic interaction between Host plant and symbiotic microbes. Its including mycorrhizal fungi and Nitrogen fixing Rhizobium.

251. Assertion (A): Azolla is used as biofertiliser in rich fields.
Reason (R): Azolla contains nitrogen fixing cyanobacteria in its root nodules.
The correct answer is
(a) Both (A) and (R) are true, and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, and (R) is not the correct explanation of (A)
(c) (A) is false, but (R) is true
(d) (A) is true, but (R) is false

AP EAMCET-2013

Ans. (a) : (A) *Azolla,* is a floating pteridophyte that is utilized as a biofertilizer due to its symbiosis with cyanobacteria in the rice fields.
(R) *Anabaena* is a nitrogen fixing cyanobacterium that is associated with *Azolla* and are together found in rice field.

252. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation.
Which one of the following statements is not correct during this process of nitrogen fixation
(a) Nitrogenase is insensitive to oxygen
(b) Leghaemoglobin scavenges oxygen and is pinkish in colour
(c) Nodules act as sites nitrogen fixation
(d) The enzyme nitrogenase catalyses the conversion of atmospheric N_2 to NH_3

AIPMT (Mains)-2010

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Ans. (a) : Leguminous plants one able to fix atmospheric nitrogen. It is participates in symbiotic nitrogen fixation. The enzyme nitrogenase is sensetive to molecular oxygen. The enzyme requirs anaerobic condition during nitrogen fixation, but live as aerobic under free living condition. Leg-haemoglobin scavenger of oxygen and it is pinkish in colour. Leg-haemoglobing provides anaerobic condition to the enzyme nitrogenase. Nodules contain biochemical components so that helps in fixing atomospheric nitrogen to ammonia. They act as sites of nitrogen fixation.

253. Legume plants are important for atmosphere because they

(a) Help in NO_2 fixation
(b) Do not help in NO_2 fixation
(c) Increase soil fertility
(d) Help in N_2 Fixation

VMMC-2007
Rajasthan PMT-2005,2006
UPCPMT-2002

Ans. (d): Legume plants belongs to Fabaceae family having root nodules found in symbiotic association with nitrogen fixing bacteria such as *Rhizobium.*

Several species of *Rhizobium,* grow over the root hairs release nod factors that cause curling of root hairs around the bacteria

The bacteria fixes the atmospheric nitrogen with the help of enzyme **nitrogenase** and they also increase the soil fertility.

254. What happened when we inoculated Rhizobium in wheat field?

(a) No increase in production (nitrogen content of soil remains same)
(b) A lot of increase in production (nitrogen content of soil increase)
(c) Fertility of soil decreases
(d) Fertility of soil increases

JIPMER-2008

Ans. (a) : If Rhizobium is inoculated in the wheat field, they won't be able to infect wheat plant and form root nodules as wheat is not a leguminous plant. Consequently, soil fertility will not change. Rhizobium is a proteobacterium. It is a genus of gram-negative bacteria. Gram-negative bacteria are those bacteria that do not retain the colour of the crystal violet stain, that is used for the gram staining of the bacteria.When we inoculated Rhizobium in wheat field, there is no increase in production, because wheat has no root nodules for fixing nitrogen content. Therefore, nitrogen content of soil will remain same.

255. Which is essential for the growth of root tip?

(a) Zn (b) Fe
(c) Ca (d) Mn

NEET-2016 Phase-II

Ans. (c) : Calcium is essential for the growth of root tips.

Calcium is involved in the formation of middle lamella of the cell wall and growth of root tip.

- Zinc is used in the formation of chlorophyll and auxins.
- Iron is essential for chlorophyll formation.
- Manganese is required during photolysis reaction in the process of photosynthesis.

256. For its action, nitrogenase requires

(a) Mn^{2+}
(b) Super oxygen redicals
(c) High input of energy
(d) Light

AIPMT (Mains)-2012

Ans. (c) : Nitrogenase require high input of energy and anaerobic condition. The enzyme nitrogenase is a Mo and Fe.

- They catalyses the conversion of atmospheric N_2 to NH_3 as.

$$N_2 + 8e^- + 8H^+ + 16ATP \longrightarrow 2NH_3 + H_2 + 16ADP + 16Pi$$

Enzyme nitrogenase functions under anaerobic condition and the pigment leghaemoglobin protect it from oxygen.

257. Which one of the following statements is correct?

(a) Legumes fix nitrogen only through the specialized bacteria that live in their roots.
(b) Legumes fix nitrogen independently of the specialized bacteria that live in their roots.
(c) Legumes fix nitrogen only through specialized bacteria that live in their leaves.
(d) Legumes are incapable of fixing nitrogen

AIPMT-1994
Manipal-2007

Ans. (b) : Legumes are able to form a symbiotic relationship with nitrogen-fixing soil bacteria called rhizobium.

258. Which of the following plants does not have Rhizobium containing root nodules?

(a) Phaseolus (b) Pinus
(c) Pisum (d) Cicer

JandK CET-2003

Ans. (b) : Pinus does not have Rhizobium containing root nodules because pinus is the sole genus in the subfamily pinoideae. Pinus is a gymnosperm. The root of pinus form mycorrhizal association with fungus.

259. Nodulated roots are found in:

(a) Malvaceae (b) Leguminosae
(c) Solanaceae (d) Compositae

Rajasthan PMT-1995

Ans. (b) : Nodulated roots are bead-like structures on the roots and found in plants that are associated with symbiotic nitrogen fixing bacteria. The root nodules contain nitrogen and Rhizobia. They are found in the family of Leguminosae.

260. Which of the following is a flowering plant with nodules containing filamentous nitrogen-fixing microorganism?

(a) Casuarina equisetifolia
(b) Crotalariajuncea

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(c) Cycaservoluta
(d) Cicer arietinum

BCECE-2012

Ans. (a) : Nitrogen fixation is a process of conversion inert atmosheric nitrogen and utilizable compound of nitrogen like Ammonia, nitrites, and nitrates filamentous frankia occurs in root nodules of casuarina and Alnus.

261. Which bacterium is associated with the roots of legumes ?
(a) Spirogyra (b) Rhizobium
(c) Clostridium (d) Nostoc

Punjab MET-1999
CG PMT-2004

Ans. (b) : Rhizobium is associated with the roots of legumes. Rhizobium lives inside root nodules of legumes and provides N_2 to the plants while leguminous plants supplies carbohydrate to bacteria and establishes Symbiotic Relationship.

262. Select the correct statement about leghaemoglobin.
(1) Leghaemoglobin is a source of energy.
(2) Leghaemoglobin is a pinkish coloured pigment found in the root nodules.
(3) Leghaemoglobin is activated by the presence of Mg^{2+} ions.
(4) Leghaemoglobin protects the nitrogen fixing enzyme nitrogenase from oxygen
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct

BHU PMT (Mains)-2009, 2007

Ans. (c) : In the above statement, only statement 2 and 4 are correct because presence of leghaemoglobin is characteristic of healthy root nodule. It is similar to Haemoglobin. Leghaemoglobin regulates oxygen concentration and consume Oxygen. Leghaemoglobin combines with oxygen and form oxyleghemoglobin and this oxyleghemoglobin maintains O_2 deficient environment which is necessary to the activity of Nitrogenase enzyme.

263. The haemoglobin like pigment can be traced in
(a) seeds of legumes
(b) Clostridium
(c) Rhizobium
(d) leguminous root nodules

AMU-2011

Ans. (d) : Leghaemoglobin (LHb) is the pink coloured pigment present in root nodules of leguminous plant, similar to Haemoglobin.
• LHb maintains anaerobic condition which is necessary for Nitrogenase enzyme to function properly. Leghaemoglobin function to facilitate movement of oxygen to bacteroid and other oxygen deficient tissues and thus maintains anaerobic condition.

264. Metabolic water is the one
(a) used during trans amination
(b) used during photosynthesis
(c) produced during aerobic utilisation of glucose
(d) produced during condensation or polymerization

CMC Vellore-2014

Ans. (c) : Metabolic refers to chemical reactions take place in living organism for vital functioning of body. Metabolic water produced by energy of food through an oxidation process. During cellular respiration, water gets produced by oxidation of fat and carbohydrate whereas during heavy exercise, water gets bonded with glucose and gets released after oxidation. Metabolic water produced during aerobic utilization of glucose.

265. Mycorrhiza helps in:
(a) Respiration
(b) Water absorption
(c) Nutrient absorption
(d) Phosphate absorption

Rajasthan PMT-2006
AIIMS-1999

Ans. (c) : Mycorrhiza is an association between fungus and roots of higher plants. It is an example of symbiotic association. The roots that are associated with fungi are thick, short. The function of mycorrhiza is to absorb water and minerals (nutrient absorption).

266. Select the correct statement
(a) Legumes are incapable of fixing nitrogen
(b) Legumes fix nitrogen through bacteria living in fruits root
(c) Legumes fix nitrogen only by bacteria present in nodules
(d) None of the above

BCECE-2007

Ans. (c) : Legumes fix nitrogen only by bacteria present in nodules. Rhizobium is present in root nodule of leguminous plant. Rhizobium is free living, gram negative, non-sporulating, aerobic and motile rod-shaped bacterium resides in soil.

267. Which of the following is an ammonifying bacterium?
(a) Clostridium (b) Azotobacter
(c) Nitrosococcus (d) Bacillus ramosus

AMU-2002

Ans. (d) : Ammonifying bacteria converts the organic nitrogen of dead plants and animals into ammonia or ammonium ions. Ammonium is then available to be assimilated and incorporated into amino acid for other metabolic purposes. Ammonifying bacteria may be either symbiotic or non- symbiotic. It provides ammonia to the plants. *Bacillus vulgaris* and *Bacillus ramosus* are ammonifying bacteria i.e. they release ammonia from dead decay of organic Nitrogen.

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13 PHOTOSYNTHESIS IN HIGHER PLANTS

A. Photosynthesis and its Experiment

1. Law of limiting factor of photosynthesis was proposed by

(a) Von Mayer (b) Arnon
(c) FF Blackmann (d) Hill

DUMET-2008 / Punjab MET-2008
BHU PMT (Screening)-2006
UP CPMT-2001, 2008 / JIPMER-2006
AIPMT-1996 / Rajasthan PMT-2007, 1998
Manipal-2005,2014 / VMMC-2012
AMU-2009 / MGIMS Wardha-2008

Ans. (c) : In 1905, F.F. Blackman proposed the "Law of limiting factor" according to this law of limiting factors, suggests that the factor which is most closest to its minimum level will limit the overall process, even if other factors are in abundance.

- **Von mayer:** A German chemist, considered as father of photosynthesis. He discovered that plants use light to convert CO_2 and water into oxygen and carbohydrates.
- **Arnon:** An American biochemist, discovered that plants use light energy to split water molecules into oxygen and hydrogen.
- **Hill:** An English plant Physiologist, discovered the hill reaction, which is the first step in photosynthesis.

2. Who proved that oxygen evolved in photosynthesis comes from water?

(a) Mayer (b) Calvin
(c) Ruben, Hassid and Kamen (d) Blackman

CG PMT-2011 / Manipal-2011
MGIMS Wardha-2009 / Haryana PMT-2003
JCECE-2004

Ans. (c) : In 1948, Ruben, Hassid and Kamen, using heavy isotope, O^{18} proved that in photosynthesis, oxygen comes from water.

3. Oxygen which is liberated during photosynthesis, comes from

(a) CO_2 (b) H_2O
(c) chlorophyll (d) phosphoglyceric acid

CG PMT-2010 / Uttarakhand PMT-2008
BVP-2007 / BHU PMT-2004
BCECE-2002 / Manipal-2008

Ans. (b) : Oxygen, which is liberated during photosynthesis, comes from the hydrolysis of water in the green plants. Cornelius Van Niel, in his study based on purple and green bacteria, demonstrated that in photosynthesis oxygen liberated from water and not from CO_2.

4. The source of oxygen evolved during photosynthesis is _____

(a) light (b) chlorophyll
(c) CO_2 (d) water

MHT CET 5.10.2020 Shift-I/ JIPMER-2000
J&K CET-2000 / Rajasthan PMT-1999

Ans. (d) : Oxygen is evolved during photosynthesis as a result of the light-dependent reactions. Light energy is used to split water molecules through a process called photolysis, releasing oxygen as a byproduct.

5. Study the following and pick up the correct statements :

I. Oriented locomotor movement of an organism towards or away from light is called photokinesis.
II. Influence of light on non directional movement of organism is known as phototaxis.
III. The orientation to light of a non-motile organism (such as plant or plant part) is known as phototropism
IV. The response of organisms for the photoperiod is known as photoperiodism

(a) I, II (b) III, IV
(c) I, III (d) II, IV

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : Statement-I : Photokinesis refers to oriented locomotor movement of an organism towards or away from light.
Statement-II : Phototaxis is one of the different forms of taxis. It is characterized by the directional movement of a cell in response to light.
Statement-III : Phototropism is the orientation to light of a non-motile organism, like a plant or plant part.
Statement-IV : Photoperiodism is the response of organisms to the duration of light and darkness.
Therefore, the correct answer is option (b) III, IV.

6. Match the following scientists with the discoveries in photosynthesis

A.	T.W. Engelmann	I.	Glucose production during photosynthesis
B.	Julius Von Sachs	II.	H_2 reduces CO_2 into carbohydrate
C.	Carolius Von Neil	III.	Green plants release O_2
D.	John Inzenhousz	IV.	Photosynthesis in Cladophora

(a) A-ii, B-i, C-iv, D-iii
(b) A-iv, B-ii, C-i, D-iii
(c) A-i, B-iv, C-ii, D-iii
(d) A-iv, B-i, C-ii, D-iii

TS EAMCET-11.05.2023, Shift-II

Ans. (d) :

A.	T.W. Engelmann	IV.	Photosynthesis in Cladophora
B.	Julius Von Sachs	I.	Glucose production during photosynthesis
C.	Carolius Von Neil	II.	H_2 reduces CO_2 into carbohydrate
D.	John Inzenhousz	III.	Green plants release O_2

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7. The reaction center in PS II has an absorption maxima at

(a) 780 nm (b) 680nm
(c) 700 nm (d) 660 nm

NEET (UG) 07.05.2023

Ans. (b) : Photosystem II is involved only in non-cyclic photophosphorylation.
This system is responsible for the photolysis of water and involves the evolution of molecular oxygen. PS II is located on the inner surface of the thylakoid i.e in the stroma and non - appressed region of grana.
The reaction centre of PS II is P680.
Chlorophyll A with peak absorption at 680nm.

8. Choose the correct statements among the following

(A) Chlorophyll is the major pigment responsible for trapping of light, accessory pigment also participate
(B) In green plants, H_2O is the hydrogen donor
(C) In purple sulphur bacteria the oxidation product is carbon
(D) Radioisotope studies proved water as source of O_2 release in photosynthesis

(a) A, B, C
(b) A, C, D
(c) A, B, D
(d) B, C, D

TS EAMCET-10.08.2021 Shift-I

Ans. (c) : Chlorophyll is the chief pigment green plants, which are responsible for trapping energy from sun light. Other thylakoid pigment like chlorophyll-b, xanthophylls, and carotenoids, which are called **accessory pigments** also absorb light and transfer the energy to chlorophyll-a.

- In green plants, water (H_2O) is the hydrogen donor and is oxidized to O_2 (oxygen).
- When H_2S is hydrogen donor for purple sulphur bacteria, the oxidation product is sulphur or sulphate.
- **Photolysis** of water is a part of the light-dependent reaction of the photosynthesis process. By using radioactive isotopes, they found that oxygen come from water.

9. Match the following?

Column - I	Column - II	Column - III
(a) Joseph Priestly	(i) Glucose production	(p) Photo-synthesis
(b) Julius Von Sachs	(ii) Role of sun light	(q) Plants restore air
(c) Jan Ingenhousz	(iii) Role of air	(r) Green parts of plants
(d) T. W. Engelmann	(iv) Action of spectrum	(s) Release of O_2

(a) (a – i – s), (b – iv – q), (c – iii – r), (d – ii – p)
(b) (a – iv – r), (b – iii – s), (c – ii – p), (d – i – q)
(c) (a – ii – p), (b – i – q), (c – iv – r), (d – iii – s)
(d) (a – iii – q), (b – i – r), (c – ii – s), (d – iv – p)

AP EAMCET-03.09.2021 Shift-I

Ans. (d) : Joseph Priestley: considered that plants purifying the air CO_2 into O_2 conduct his experiment on mint plant with mouse and candle.

- **Julius von Sachs:** Photosynthesis occur in the chloroplast and starch stored in the chloroplast.
- **Jan Ingenhousz:** Only green plant have capacity to purify the air in the presence of light.
- **T.W. Engelmann:** action of spectrum of photosynthesis.

10. Identify the wrong statements.

(A) Cytochrome C is a small protein attached to inner surface of the outer membrane.
(B) Electrons from complex I are transferred to ubiquinone located within the inner membrane.
(C) The temperature optimum for photosynthesis of different plants does not depend on the habitat that they are adapted to.
(D) There is no linear relationship between incident light and CO_2 fixation rates at low light intensities.

Options:

(a) A, B, C (b) B, A, D
(c) C, B, D (d) A, C, D

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : The cytochrome complex, or cyt c, is small hemeprotein found loosely associated with the inner membrane of the mitochondrion.

- Electrons from complex I are transferred to ubiquinone located within the inner membrane.
- The temperature optimum for photosynthesis of different plants also depends on the habitat that they are adapted too. Tropical plants have a higher temperature optimum than the plants adapted to temperate climates.
- There exists a linear relationship between incident light and CO_2 fixation rates at low light intensities. At higher light intensities, gradually the rate does not show further increase as other factors become limiting.

11. Out of the 56% of sunlight reaching the earth's atmosphere _____ is used for photosynthesis.

(a) 0.05 % (b) 0.02 %
(c) 10 % (d) 0.2 %

MHT CET 5.10.2020 Shift-I

Ans. (d) : 0.2 % is used for photosynthesis because plants do not absorb all incoming sunlight and do not convert all harvested energy into biomass.

12. On land, plants get carbon from _____.

(a) carbonate rocks in the surroundings
(b) supplements added to the soil
(c) the CO_2 dissolved in soil water
(d) fixation of atmospheric CO_2 during photosynthesis

MHT CET-06.10.2020 Shift-I

Ans. (d) : Plants on land obtain carbon from atmospheric CO_2 fixation through photosynthesis, which is subsequently transmitted on to all living things. Soil holds a large amount of active carbon on earth. Plants take carbon from the air and convert it to plant tissue, some of which returns to the soil as plant residue.

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13. Percentage of the total incident solar radiation the percentage Photosynthetically Active Radiation (PAR) captured by the plants.

(a) 2 – 10% of PAR only
(b) 30 – 40% of PAR only
(c) 10 – 20% of PAR only
(d) 0 – 10% of PAR only

Karnataka CET-2019

Ans. (a) : Around 50% of the total radiation from sunlight falls under photosynthetically active radiation and supports the process of photosynthesis. Out of which only 2- 10% are captured by plants rest are absorbed by chlorophyll.
Photosynthesis is the conversion of light energy into the chemical energy which is stored in the bond of chemical.

14. The amount of CO_2 and H_2O absorbed to produce 180 g of glucose are

(a) 193 and 264 grams respectively
(b) 108 and 264 grams respectively
(c) 264 and 108 grams respectively
(d) 162 and 264 grams respectively

TS EAMCET-02.05.2018 Shift-II

Ans. (c) : To produce 180 grams of glucose through photosynthesis, the chemical reaction can be represented as:
$6CO_2 + 6\ H_2O$ + light energy + Chl$\rightarrow$ $C_6\ H_{12}O_6 + 6O_2\uparrow$.
From this equation, it can be determined that for 180 grams of glucose:
• 6 moles of CO_2 are needed (6×44 g/mole = 264 g)
• 6 moles of H_2O are needed (6×18 g/mole = 108g).
So, the correct option is (c) 264 and 108 gm respectively.

15. 'In the presence of bright sunlight small bubbles are formed around green parts of the plant'. Who showed this?

(a) Joseph Priestley (b) Robert Hill
(c) Jan Ingenhousz (d) Julius Von Sachs

GUJCET-2018

Ans. (c): Jan Ingenhousz , a Dutch – British scientist, conducted experiments in the late 18th century that led to the discovery of photosynthesis. In 1779 he observed that when green aquatic plants were exposed to sunlight, they released tiny bubbles of oxygen gas. He found that these bubbles were produced in the presence of sunlight and that they originated from the green parts of the plant.

16. Three cellular processes are listed below. Choose the correct combination of processes that involve proton gradient across the membrane.

(i) Photosynthesis (ii) Aerobic respiration
(iii) Anaerobic respiration

(a) ii and iii (b) i and ii
(c) i, ii and iii (d) i and iii

KVPY (SA)-05.11.2017

Ans. (b) : In photosynthesis, photo-phosphorylation and in aerobic respiration, oxidative phosphorylation occurs that requires proton gradient across the membrane.

• The photosynthesis is the process by which green part of the plant synthesis organic compound (carbohydrate) by using simple inorganic compound ($H_2O + CO_2$) in the presence light and by product H_2 O and CO_2 released in the atmosphere.

17. Match the following lists

List I	List II
(A) A.G. Tansley	(i) Classified plant communities
(B) Wanning	(ii) "Structure and function of Nature"
(C) Odum	(iii) Term-'Biosphere'
(D) Reiter	(iv) Term – 'Ecology'
	(v) Term –'Ecosystem'

The correct match is

	A	B	C	D
(a)	(v)	(i)	(ii)	(iv)
(b)	(ii)	(v)	(i)	(iii)
(c)	(iv)	(iii)	(v)	(ii)
(d)	(iv)	(iii)	(v)	(i)

AP EAMCET-2013

Ans. (a):
(a) A.G. tansley - Term 'Ecosystem'
(b) Wanning - Classified Plant Communities
(c) Odum - Structure and function of nature
(d) Reiter - Term 'Ecology' (1885)

18. Which statement about photosynthesis is false?

(a) Photosynthesis is a redox process in which water is oxidized and carbon dioxide is reduced.
(b) The enzymes required for carbon fixation are located only in the grana of chloroplasts.
(c) In green plants both PS I and PS II are required for the formation of $NADPH + H^+$.
(d) The electron carriers involved in photophosphorylation are located on the thylakoid membranes.

Manipal-2009
Karnataka CET-2009

Ans. (b) : The the statement that the enzymes required for carbon fixation are located only in the grana of chloroplasts is not true. The light independent reactions, which included the calvin cycle and carbon fixation, occur in the stroma.

19. Which one group of plants were introduced by Otto Warburg and others for advanced study of photosynthesis?

(a) Chlorella and Ulva
(b) Chlorella and volvox
(c) Scenedesmus and Chlorella
(d) All of the above

UP CPMT-2014

Ans. (c): Warburg effect is the inhibitory effect of high oxygen concentrations on photosynthesis. He was a German scientist, who reported in chlorella algae and scenedesmus, that high O_2 level inhibit rate of photosynthesis.

20. A plant is provided with ideal conditions for photosynthesis and supplied with isotope $^{14}CO_2$. When the products of the process are analysed carefully, what would be the nature of products?

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(a) Both glucose and oxygen are labelled.
(b) Only oxygen is labeled but glucose is normal.
(c) Both glucose and oxygen are normal.
(d) Only glucose is labeled and oxygen is normal

Karnataka CET-2016

Ans. (d) : When a plant provided with $^{14}CO_2$ indicates that the CO_2 contains a radioactive isotope of carbon (C), only glucose will be labeled with radioactive carbon. This is because during photosynthesis, plants use CO_2 to synthesize glucose.

21. Maximum photosynthesis takes place by
(a) Phytoplankton (b) Zooplankton
(c) Marsh plants (d) Woody plants

AIPMT-1999

Ans. (a) : Maximum photosynthesis takes place by phytoplankton.
Phytoplankton are the microscopic algae found in ocean, seas and freshwater. They possess more photosynthesis as they contain chlorophyll in large amounts.

22. Emerson's enhancement effect and Red drop have been instrumental in the discovery of:
(a) Oxidative phosphorylation
(b) Photophosphorylation and non-cyclic electron transport
(c) Two photo systems operating simultaneously
(d) Photophosphorylation and cyclic electron transport

NEET-2016 Phase-I

Ans. (c) : Emerson's enhancement effect and the red drop experiment were crucial in revealing that photosynthesis relies on two photosystem operating together: Photosystem I (PS-I) and photosystem II (PS-II). These system work simultaneously to convert light energy into chemical energy which produce ATP and NADPH, essential for the process of photosynthesis.

23. Photosynthetic Active Radiation (PAR) has the following range of wavelengths
(a) 400 - 700 nm (b) 450 - 950 nm
(c) 340 - 450 nm (d) 500 – 600 nm

JIPMER-2007

Ans. (a) : Photosynthesis Active Radiation (PAR) has the 400 - 700 nm range of wavelengths.

24. For assimilation of one CO_2 molecule; the energy required in form of ATP & $NADPH_2$
(a) 2 ATP & 2 $NADPH_2$
(b) 5 ATP & 3 $NADPH_2$
(c) 3 ATP & 2 $NADPH_2$
(d) 18 ATP & 12 $NADPH_2$

AIPMT-2000

Ans. (c) : Photosynthesis is actually an oxidation-reduction process in which water is oxidized and CO_2 is reduced to carbohydrates. The reduction of CO_2 to carbohydrates needs assimilatory powers i.e. ATP and $NADPH_2$.
In the calvin cycle, CO_2 acceptor molecule is RuBP or RuDP. The enzyme catalyzing this reaction is RuBP - carboxylase/oxygenase (RuBisCO). As Calvin cycle takes in only one carbon (as CO_2) at a time, it takes six turns of the cycle to produce a net gain of six carbons (i.e., hexose or glucose). In this cycle, for the formation of one mole of hexose sugar (glucose), 18 ATP and 12 $NADPH_2$ are used. For 6 molecules of CO_2, it needs 18 ATP and 12 $NADPH_2$ molecules. So for the assimilation of one molecule of CO_2, it needs 3 ATP and 2 $NADPH_2$ molecules.

25. The first step for initiation of photosynthesis will be:
(a) Photolysis in water
(b) Excitement of chlorophyll molecule due to absorption of light
(c) ATP formation
(d) Glucose formation

AIPMT-2000

Ans. (b) : Plant leaves contain chloroplasts, which contain red, to green pigments known as chlorophylls where photosynthesis occurs. The photon of light that the chlorophyll absorbs causes it to become excited and release electrons.
Hence, the first step in photosynthesis is the excitement of an electron of chlorophyll by a photon of light.

26. Total amount of energy trapped by green plants in food is called
(a) Gross primary production
(b) Net primary production
(c) Standing crop
(d) Standing state

AIPMT-1998

Ans. (a) : Gross primary productivity:- It is the rate of the production of organic matter during photosynthesis, showing total solar energy converted into chemical energy. So the total amount of energy trapped.
- Gross primary productivity (GPP) is the rate at which solar energy is captured in sugar molecule during photosynthesis.

27. Match the columns.

Column I (Scientists)		Column II (Discoveries)	
A.	Stephan Hales	1.	Importance of light and chlorophyll
B.	Ingenhousz	2.	Presence of chlorophyll in plants
C.	Von Mohl	3.	Product of photosynthesis is starch
D.	Sach	4.	Air and light control plant growth

Code

	A	B	C	D
(a)	4	1	2	3
(b)	3	2	1	4
(c)	2	3	4	1
(d)	4	3	2	1

AIIMS-2011

Ans. (a) : Stephan Hales→ Air and light control plant growth
Ingen Housz→ Importance of light and chlorophyll
Von Mohl→ Presence of chlorophyll in plants
Sach→ Product of photosynthesis is starch

28. A photosynthesising plant is releasing ^{18}O more than the normal. The plant must have been supplied with

@apna_pdf

(a) O_3 (b) H_2O with ^{18}O
(c) CO_2 with ^{18}O (d) $C_6H_{12}O_6$ with ^{18}O

AIPMT-1993

Ans. (b) : The water molecule breaks up into hydrogen and oxygen in the illuminated chloroplasts, which is called photolysis of water.
A Photosynthesizing plant is reclosing ^{18}O, more than the normal. The plant must have been supplied with ^{18}O with H_2O.

29. In photosynthesis electron transport system, manganese ions are associated with:
(a) oxygen evolving complex
(b) CF_0 - CF_1 complex
(c) cytochrome b_6 –f complex
(d) plastoquinones

AP EAMCET-2002

Ans. (a) : In PS - II there is a complex of proteins with Mn^{2+} known as the water splitting center, which extracts the electrons from water with the release of oxygen and protons (H^+) and passes them on to P_{680} molecules.

30. Photosynthetic enhancement with flashing light was first observed by :
(a) Benson and Calvin (b) Hill and Calvin
(c) Hatch and Slack (d) Emerson and Arnold

JCECE-2007 / AFMC-2006

Ans. (d) : Photosynthetic enhancement with flashing light was first observed by Emerson and Arnold. Robert Emerson and his coworkers gives the evidence of two pigment system in light reaction of photosynthesis. These are photosystem I and photosystem II.

31. Most effective wavelength of light for photosynthesis is
(a) green (b) violet
(c) red (d) yellow

BVP-2012 / MGIMS Wardha-2006

Ans. (c) : The most effective wavelength of light for photosynthesis is red. The red wavelength range is 660 - 760 nm. Red light has the highest absorption by chlorophyll, it is the most effective wavelength for photosynthesis.

32. Primary acceptor of CO_2 in photosynthesis is:
(a) Phosphoric acid
(b) Rlbulose phosphate
(c) Glucose
(d) Ribulose 1, 5 biphosphate

Rajasthan PMT-2006
J&K CET-2006

Ans. (d) : Ribulose - 1, 5 - biphosphate acts as CO_2 acceptor and 6 moles of RuBP react with 6 moles of CO_2 and 6 moles of water giving rise to 12 moles of 3-phosphoglyceric acid.
Ribulose - 1, 5 - biphosphate (6 moles) + $6CO_2$ + 6 $H_2O \xrightarrow{\text{Carboxydismutase}}$ 3- phosphoglyceric acid(12 moles)

33. In which plant, Calvin experimented by radioactive isotopy to discover the stable product of C_3–cycle?
(a) Chlorella (b) Cycas
(c) Carrot (d) Tabacco

Manipal-2010

Ans. (a) : In 1954, Calvin, Benson, and their coworkers worked out the path of carbon. This path of carbon was studied with the help of radioactive tracer technique using Chlorella, a unicellular green alga, and CO_2 with C^{14} atomic weight.

34. How much energy is used in photosynthesis ?
(a) 50% (b) 35%
(c) 10% (d) 1 to 2%

Rajasthan PMT-2000

Ans. (d) : Between 98 to 99 percent of solar energy reaching earth is reflected from plants parts and absorbed by other molecules, which convert it into heat. Thus, only 1 to 2 percent of the available energy is used in photosynthesis.

35. Assimilatory power in photosynthesis refers to
(a) ATP + $NADPH_2$ + CO_2
(b) ATP + $NADPH_2$
(c) ATP
(d) $NADPH_2$

AMU-2003

Ans. (b) : Melvin Calvin used the term assimilatory power for ATP + $NADPH_2$· NADPH alone act as a reducing agent. ATP and NADPH molecules transfer the energy of sunlight into dark reactions, leading to the formation of high-energy carbon containing compounds, mainly sugars.

36. In photosynthesis carbon dioxide is converted to carbohydrates. It is a ..... process.
(a) reductive (b) oxidative
(c) catabolic and exergonic (d) None of the above

JIPMER-2013

Ans. (a) : In photosynthesis, carbon dioxide is converted into carbohydrates through a reductive process. This process involves the reduction of carbon dioxide using energy from sunlight, which is captured by chlorophyll and other pigments in plants. The reduction of CO_2 leads to the production of glucose and other carbohydrates, which store energy from sunlight for later use by the plant.

37. Phenomenon which converts light energy into chemical energy is:
(a) respiration (b) photosynthesis
(c) transpiration (d) none of these

AFMC-2005

Ans. (b) : Photosynthesis literally means 'synthesis using light'.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6CO_2 \uparrow$$

In this process, the green part of the plant captures photons of light and converts their radiant energy into a chemical form of energy.

38. Energy transfer in photosynthesis occure as:
(a) phycoerythrin→ phycocyanin→ carotenoid→ Chlorophyll-a
(b) chlorophyll-b→ carotenoid→ phycoerythrin→ chlorophyll-a
(c) phycocyanin→ phycoerythrin→ carotenoid→ chlorophyll-a
(d) chloroiphyll-b→ carotenoid→ phycocyanin→ chlorophyll-a

JIPMER-2005 / BHU PMT-2003

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Ans. (c) : The energy transfer sequence in photosynthesis is: Phycocyanin → Phycoerythrin → carotenoid → chlorophyll-a.
This sequence describes how light energy is absorbed and transferred among pigment to eventually reach chlorophyll-a, which is crucial for photosynthesis.

39. In photosynthesis action and absorption spectrum were related by:
(a) Von Helmont (b) Engelmann
(c) Emerson (d) Lavosier

Haryana PMT-2005
JIPMER-2005
BHU PMT-2003

Ans. (b) : A German biologist, Theodore Engelmann, gives the first action spectrum of photosynthesis. Using aerobic bacteria and filamentous algae spirogyra or Cladophora.

40. In photosynthesis there is
(a) reduction of H_2O (b) oxidation of H_2O
(c) oxidation of CO_2 (d) oxidation of NO_2

DUMET-2005
UP CPMT-2003

Ans. (b) : In photosynthesis, oxidation of H_2O take place, which means it loses electrons and reduction of CO_2, which means it gains electrons. The process of photosynthesis is commonly written as:-

$$6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$$

41. Which of the following elements is an activator for both ribulosbiphosphate carboxylase oxygenase and phosphoenol pyruvate carboxylase in photosynthetic carbon fixation?
(a) Mg^{2+} (b) Zn^{2+}
(c) Ca^{2+} (d) SO_4^{2-}

AFMC -2009

Ans. (a) : Magnesium is a macronutrients usually present in the plant tissues. Mg^{2+} act as a co-factor and help to activate the both enzymes, ribulose bisphosphate carboxylase/oxygenase and phosphoenolpyruvate carboxylase. Both enzymes are essential for the photosynthetic CO_2 fixation.

42. A student sets up an experiment on photosynthesis as follows :
He takes soda water in a glass tumbler and a chlorophyll extracts into the contents and keeps the tumbler exposed to sunlight hoping that he has provided necessary ingredients for photosynthesis to proceed (viz., CO_2, H_2O, chlorophyll and light). What do you think what will happen after, say, a few hours of exposure of light ?
(a) Photosynthesis will take place and glucose will be produced
(b) Photosynthesis will take place and starch will be produced which will turn the mixture turbid
(c) Photosynthesis will not take place because CO_2 dissolved in soda water escapes into the atmosphere
(d) Photosynthesis will not take place because intact chloroplasts are needed for the process

HP CET-2011

Ans. (d) : Photosynthesis will not take place because intact chloroplasts are needed for the process. Without intact chloroplasts, which contain the necessary pigments and enzymes for photosynthesis, the process cannot occur effectively, even if all other necessary ingredients (CO_2, water and light) are present.

43. The role of phycobilins in photosynthesis to
(a) absorb and transfer energy to chlorophyll
(b) donate electrons to the electron transport system
(c) fix carbon dioxide
(d) carry hydrogen or electrons

CG PMT-2007

Ans. (a) : Phycobilins are water soluble accessory photosynthetic pigment in plants.
- Phycobilins are present in blue-green-algae and Red algae.
- Three pigments (chlorophyll, caretenoids, and phycobilins) help in the absorption of light energy to synthesize complex organic material.

44. In photosynthesis energy from light reaction to dark reaction is transferred in the form of
(a) ADP (b) ATP
(c) RuBP (d) Chlorophyll

AMU-2007

Ans. (b) : In light reaction, $NADPH_2$, ATP and oxygen are formed. Oxygen is released into atmosphere while $NADPH_2$ and ATP are utilized for reduction of CO_2 to carbohydrate in the dark reaction.

45. Solar radiation of wave length less than 360 millimicrons is:
(a) ultraviolet radiation (b) infrared radiation
(c) radio waves (d) visible light

AP EAMCET-2004

Ans. (a) : The band of color is the visible spectrum. i.e., they absorb light and transfer it to chlorophyll. The complete visible spectrum is composed of the seven color (VIBGYOR), starting with the shortest rays, violet, indigo, blue, green, yellow, orange, and red. Beyond the red are still longer invisible rays called infrared, and beyond violet are shorter invisible rays are called ultraviolet.

46. The isotope of carbon used extensively for studies in photosynthesis is:
(a) ^{13}C (b) ^{14}C
(c) ^{15}C (d) ^{16}C

Haryana PMT-2002

Ans. (b) : Calvin traced the path of carbon in photosynthesis and gave the C_3 cycle. He traced the metabolic pathway by using the radioactive isotope C^{14}.

47. Which one of the following categories of organisms do not evolve oxygen during photosynthesis?
(a) Red algae
(b) Photosynthetic bacteria
(c) C_4 plants with Kranz anatomy
(d) Blue green algae

Haryana PMT-2004

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Ans. (b) : Van Neil proved that sulfur bacteria use H_2S in place of water and CO_2 to synthesize carbohydrates, as follow.

$$6CO_2 + 12\ H_2S \longrightarrow C_6H_{12}O_6 + 6H_2O + 12S$$

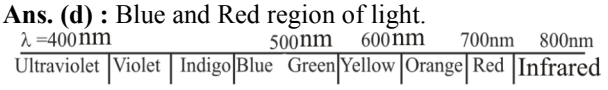
So, No oxygen is evolved as it does not involve splitting water.

48. Maximum photosynthetic activity occur in

(a) green and yellow region of light
(b) blue and orange region of light
(c) violet and orange region of light
(d) blue and red region of light

VMMC-2014
Rajasthan PMT-1998

Ans. (d) : Blue and Red region of light.



Electromagnetic spectrum of light

49. In the overall process of photosynthesis, the number of CO_2, water, sugar and O_2 molecules utilized and produced is

(a) 12 (b) 13
(c) 19 (d) 31

AMU-2012

Ans. (d) : $6CO_2 + 12\ H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$

In photosynthesis reaction to produce one molecule of carbohydrates, totally 6 molecules of CO_2 and 12 molecules of water are required-

1 glucose molecule = 6 molecules of CO_2 and 12 molecules of H_2O required.

$= 6 + 12 + 1 + 6 + 6 = 31$

50. Isotopes used in photosynthesis are

(a) C^{11} and P^{32} (b) C^{15} and P^{32}
(c) C^{16} and N^{15} (d) C^{14} and O^{18}

CG PMT-2006

Ans. (d) : The isotopes used in photosynthesis are C^{14} and O^{18}. Carbon-14 is used by Melvin Calvin to track the CO_2 uptake and incorporation into organic molecules during photosynthesis.

Oxygen-18 is used by Ruben and Kamen to study the oxygen exchange and release during photosynthesis.

B. Where does photosynthesis takes place

51. Quantasome are present in

(a) chloroplast (b) mitochondria
(c) Golgi body (d) lysosome

BHU PMT (Screening)-2009
Uttarakhand PMT-2009, 2007
VMMC-2007 / JIPMER-2012

Ans. (a) : Chloroplast double membrane bounded structure outer and inner membrane about are 50Å in thickness and made up of lipoprotein. Quantasomes are particles found in the thylakoid membrane of chloroplasts. They are embedded in a paracrystalline array on the surface of thylakoid discs in chloroplast. It is the photosynthesis units present in the thylakoids of chloroplast. Each of the quantasomes contains about 250-300 chlorophyll molecules.

- Mitochondrion is absent in the prokaryotic cells and also absent in mature RBC in humans and present in both plant and animals.
  Kolliker (1882) first observed mitochondria in striated muscles in insects. But credit of discovery was given to Flemming (1882) and Altman (1894). The term mitochondrion was given by Benda (1897).
- Aerobic reaction occurs in the mitochondria and production of ATP therefore mitochondria is called power house of the cell.
- **Camillo Golgi (1898)** first observed densely stained reticular structures near the nucleus. These were later named Golgi bodies after him. They consists of many flat, disc-shaped-sacs or cistrernae. Golgi apparatus principally performs the function of packaging materials, to be delivered either to the intracellular targets or secreted outside the cell.

52. In plants sugar synthesis takes place in

(a) Grana of chloroplast
(b) Stroma lamella of chloroplast
(c) Mitochondrial matrix
(d) Stroma of chloroplast

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Sugar synthesis in plants primarily occurs in the strome of chloroplasts, specifically during the light-independent reactions of photosynethesis, which is also known as the Calvin cycle.

53. During CO_2 fixation of photosynthesis, Oxaloacetic acid is formed in which cells?

(a) Mesophyll cells of C_3 plants and bundle sheath cells of CAM plants
(b) Bundle sheath cells of both C_4 plants and C_3 plants
(c) Mesophyll cells of both CAM plants and C_4 plants
(d) Mesophyll cells of CAM plants and bundle sheath cells of C_4 plants

TS EAMCET-11.05.2023, Shift-II

Ans. (c) : Oxaloacetic acid is formed in the mesophyll cells of both CAM plants and C_4 plants. In CAM plants, oxaloacetic acid is formed during the night and then decarboxylated during the day. In C_4 plants, oxaloacetic acid is formed during the day and decarboxylated in the bundle sheath cells.

54. Functions of lamellae of grana and stroma lamellae of chloroplast during photo phosphorylation

(a) Both release $NADPH_2$ and ATP
(b) Former release $NADPH_2$ and ATP, later splits water
(c) Former splits water, later produce ATP
(d) Both splits water and release ATP

AP EAMCET-25.04.2018 Shift-II

Ans. (c) : The stroma lamellae act as the skeleton of chloroplast. The stroma lamellae help absorb maximum sunlight so as to increase the rate of photosynthesis. It also helps increase the efficiency of photosynthesis by keeping the grana at a particular distance. Cyclic Photophosphorylation takes place in chloroplasts in the leaves. It takes place in the stroma lamellae memberane of chloroplasts.

@apna_pdf

55. Find out the location of the following molecules in different compounds of chloroplast :

List-I	List-II
(A) NADP reductase	(i) Embeded in the membrane of Thylakoid
(B) Protons produced by	(ii) Lumen of the Thylakoids
(C) F_0 component of the ATPase	(iii) Outer surface of the Thylakoid membrane
(D) F_1 component of the ATPase	(iv) Stroma side of the membrane

The correct answer is

	A	B	C	D
(a)	(iv)	(ii)	(i)	(iii)
(b)	(ii)	(iii)	(i)	(iv)
(c)	(iv)	(i)	(iii)	(ii)
(d)	(i)	(iv)	(ii)	(iii)

TS EAMCET-02.05.2018 Shift-II

Ans. (a) :

	List – I	List - II
a.	NADP reductase	Stroma side of the membrane
b.	Protons produced by	Lumen of the thylakoids
c.	F_0 component of the ATPase	Embeded in the membrane of thylakoid
d.	F_1 component of the ATPase	outer surface of the thylakoid membrane

56. Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?

(a) Lysosome (b) Ribosome
(c) Chloroplast (d) Mitochondrion

NEET-2017

Ans. (d) : Mitochondria are the cell organelles responsible for extracting energy form carbohydrates through a process called cellular respiration. This process occurs in the presence of oxygen and takes place in the mitochondria's inner membrane. During cellular respiration, glucose is broken down into carbon dioxide and water, and in this process, energy is released and captured in the form of ATP.

57. In a Chloroplast the highest number of protons are found in

(a) Antennae complex (b) Stroma
(c) Lumen of thylakoids (d) Inter membrane space

NEET-2016 Phase-I

Ans. (c) : The highest number of protons is found in the lumen of thylakoid of the chloroplast during the day time due to **photolysis of water** and active transport of protons by plastoquinone from stroma to the lumen of the thylakoid.
So, when the splitting of water molecules occurs, the hydrogen ions or protons get accumulated on the inner side of the membrane.

58. Stroma in the chloroplast of higher plant contains

(a) Chlorophyll
(b) Light-independent reaction enzymes
(c) Light-dependent reaction enzymes
(d) Ribosomes

AIPMT-2009

Ans. (b) : The stroma of the chloroplast contains light independent reaction enzymes, ribsomes and DNA. Chlorophyll is found in the thylakoid memebrane which is flattened sac that is stacked together to form grana. The light dependent reactions of photosynthesis takes place in the thylakoid membrane.
Chlorophyll is a photosynthetic pigment and ribosomes are sites for protein synthesis.

59. Chlorophyll in chloroplasts is located in

(a) grana (b) pyrenoid
(c) stroma (d) both (a) and (c)

JIPMER-2007

Ans. (a) : Chlorophyll is present in the grana of the chloroplast. Grana refers to the stacks of thylakoids embedded in the stroma of a chloroplast.

60. What change occurs during conversion of proto chlorophyll to chlorophyll

(a) Addition of 2H in one pyrrole ring
(b) Loss of 2H
(c) Addition of Mg
(d) Loss of Mg

AIPMT-1998

Ans. (a) : The conversion of proto chlorophyll to chlorophyll involves the addition of two hydrogen atoms to one of the pyrrole rings. This changes the structure of the ring and makes it more stable. The magnesium atom is not added until later in the process.
The chemical reaction-
Protochlrophyllide + 2H $\rightarrow$ chlorophyllide
chlorophyllide $+Mg^{2+} \rightarrow$ chlorophyll.
• Protochlorophyllide is the precursor to chlorophyll. It is a colorless compound that is converted to chlorophyll in the presence of light and magnesium ions.

61. In chloroplasts, chlorophyll is present in the :-

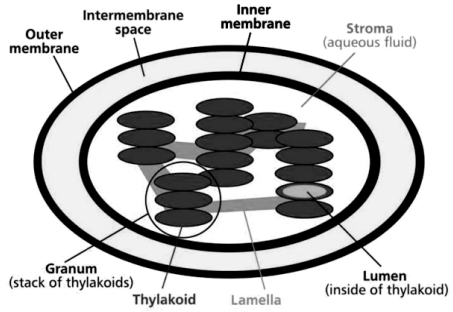
(a) Inner membrane (b) Thylakoids
(c) Stroma (d) Outer membrane

AIPMT-2004

Ans. (b) : In chloroplast, chlorophyll is present in the Thylakoid.

- Thylakoide are found inside the chloroplast. It is round, flat, and membrane-bound structures within the chloroplast.
- Stroma refers to a colourless jell-like matrix of chloroplast in which the dark reaction of photosynthesis take place.

The cavity of chloroplast have stroma and lamellar system.



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62. In photosynthesis, the light-independent reactions take place at

(a) Stromal matrix (b) Thallacoid lumen
(c) Photosystem I (d) Photosystem II

AIPMT (Re-Exam)-2015

Ans. (a) : Light Independent reaction or Dark reaction occur in stroma or stromal matrix. During these reactions carbon dioxide is reduced to carbohydrates.
The phtosystem I and photosystem II are located in the thylakoid membranes, and they are involved in the light dependent reaction.

63. Chloroplast has maximum quantity of.....in stroma.

(a) Dehydrogenase (b) RuBP carboxylase
(c) Pyruvic carboxylase (d) Hexokinase

MGIMS Wardha-2011

Ans. (b) : RuBP carboxylase is the enzyme that catalyzes the first step of the Calvin cycle, which is the light independent reactions of photosynthesis. It is the most abundant protein on earth, and it is found in the stroma of the chloroplast.

- Dehydrogenase is an enzyme that catalyzes the oxidation- reduction reactions of cellular metabolism.
- Hexokinase is an enzymes that catalyzes the carboxylation of pyruvic acid.

64. Grassland with scattered tress is

(a) savannah (b) deciduous forest
(c) evergreen forest (d) tropical rain forest

BVP-2012

Ans. (a) : Savannah are warm climate plains having coarse grass with scattered tree on the masgin of tropics. Average total rainfall is 100 – 150cm. Most of these grass species show C_4 photo- synthesis cycle.

65. In the process of photosynthesis water molecule breaks is:

(a) red drop (b) photolysis
(c) phosphorylation (d) carbon assimilation

JCECE-2005

Ans. (b) : Photolysis is the process of splitting water molecules into hydrogen and oxygen using light energy. It occurs in the thylakoid membrane of the chloroplast, which is where the light dependent reactions of photosynthesis takes place.

- Red drop is a phenomenon that occurs in the absorption spectrum of chlorophyll when the light intensity is very high.

66. Oxygen is released from:

(a) cytoplasm (b) golgi body
(c) chloroplast (d) mitochondria

VMMC-2002

Ans. (c) : The oxygen released during photosynthesis is a byproduct of light-dependent reactions, which take place in the thylakoid membranes of the chloroplast. The light energy is used to split water molecules into oxygen and hydrogen ions. The oxygen is released to into atmosphere, while the hydrogen ions are used to produces ATP.
The oxygen released by plant is essential for life on earth.

67. The creation of proton gradient across the thylakoid membrane is a result of

(a) decrease in proton number in stroma
(b) accumulation of protons in the lumen
(c) decrease in the pH in the lumen
(d) All of the above

AMU-2010

Ans. (d) : Protons $[H]^+$ move from a higher concentration in the lumen through the ATP synthetase into the stroma, thereby driving the phosphorylation process. ATP synthetase is bound to the stroma side of the thylakoid membrane in the presence of the proton gradient from ATP inorganic phosphate and ADP.

68. Agranal chloroplast is common in:

(a) C_3 plants (b) Hydrophytes
(c) C_4 plants (d) Succulents

VMMC-2006

Ans. (c) : Agranal chloroplasts are found in the bundle sheath cells of C_4 plants. C_4 plants are a type of plant that has a special mechanism for fixing carbon dioxide. They have two types of cells in their leaves, the Mesophyll cells and Bundle sheath cells.
The mesophyll cells contains granal chloroplast, which are the normal type of chloroplasts that are found in plants. The bundle sheath cells contains agranal chloroplasts, which do not have grana.

69. C_{40} H_{56} is the empirical formula of:

(a) carotene (b) chlorophyll-b
(c) xanthophyll (d) anthocyanin

Haryana PMT-2002

Ans. (a) : Carotenoid protect the chlorophyll. molecule from the photo-oxidation they act as shield pigment. Carotenoid are two types – Carotein & Xanthophylls.
Carotenes are photosynthetic pigments. They are lipid-soluble and present in all photosynthetic organisms, therefore they are called universal accessory pigments.
Xanthophulls – These are yellow in colour many different types lutin, viloxanthin, fucoxanthin etc. out of these lutin is most common, formula $C_{40}H_{56}O_2$.

70. Photochemical reactions in the chloroplasts are directly involved in

(a) fixation of carbon dioxide
(b) synthesis of glucose and starch
(c) formation of phosphoglyceric acid
(d) photolysis of water and phosphorylation of ADP to ATP

AMU-2005

Ans. (d) : The photochemical reaction takes place in the grana of the chloroplast and includes those activities for light which is essential. The splitting of water during photosynthesis is called photolysis. In this process, light energy is converted to chemical energy, which is stored in the form of ATP.

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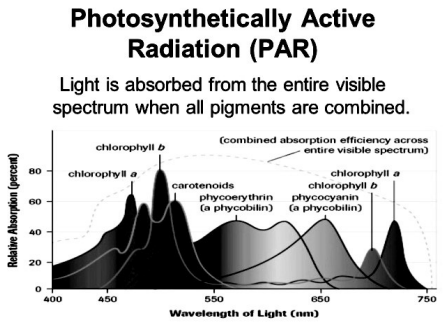
C. Pigments Involved in Photosynthesis

71. The chemical formula of chlorophyll-b is:
(a) $C_{55}H_{72}O_5N_5Mg$ (b) $C_{55}H_{72}O_5N_4Mg$
(c) $C_{55}H_{70}O_6N_4Mg$ (d) $C_{55}H_{70}O_5N_5Mg$
JIPMER -2018 / BHU PMT(Mains)-2005
VMMC-2003 / Haryana PMT-2001
Karnataka CET-2000

Ans. (c) : Chlorophyll 'b', Molecular formula – $C_{55}H_{70}O6\ N_4\ Mg$
Found in all the green algae, bryophytes, pteridophytes, gymnosperms and angiosperms where reserve food is starch 25% has CHO (aldehyde) group at the 3-carbon position and absorb 453, 430, 642 nm wavelength of light.
Chlorophyll 'a'– Molecular formula – $C_{55}H_{72}O_5N_4Mg$
It is universal pigment found in all the green plants, which evolve O_2 bactera. It occurs 75% and has– CH_3 group at the 3–carbon position and absorb–429, 410, 660, 680 nm wave length of light.

72. Wavelength of visibile light/PAR is
(a) 200 - 400 nm (b) 700 - 900 nm
(c) 400 - 700 nm (d) 100 - 200 nm
Uttarakhand PMT-2010 / DUMET-2008
AIIMS-2007 / AIPMT-2005,2004

Ans. (c) :



Photosynthetically active radiation range -
The solar radiation absorbed for the photosynthesis process is in the range of 400-700 nm wavelength, i.e. the visible light spectrum. It is the optical range, which is not harmful for living organisms.
Shorter wavelength are damaging to cells and are filtered by the ozone layer while longer wavelengths have less energy to carry out photosynthesis.
Some bacteria like cyanobacteria can use extended spectral regions.

73. The colour of chlorophyll b" in the chromatogram.
(a) Yellow orange (b) Yellow
(c) Bright or blue green (d) Yellow green
AP EAPCET-22.05.2023, Shift-II

Ans. (d) : Chlorophyll-b is in chromatogram show yellow-green color. Chlorophyll-b is a green pigment that absorbs blue and red light. It helps chlorophyll-a for absorbing light energy.
- Yellow-orange, is the color of carotenoids.
- Yellow is the color of xanthophylls.
- Bright or blue green is the color of chlorophyll-a.

74. Chlorophyll-a is _____ in colour.
(a) yellow (b) blue green
(c) orange (d) yellow green
MHT CET-06.10.2020 Shift-I

Ans. (b) : Chlorophyll-a is the universal photosynthetic pigment. Chlorophyll-a is bluish green in colour chlorophyll-a absorb Red and Blue light.

75. Photosystem II occurs in
(a) stroma (b) cytochrome
(c) grana (d) mitochondrial surface
SRM JEEE-2018

Ans. (c) : Photosystem II occurs in grana. It is the first step in the chain of photosynthesis. It is responsible for capturing light energy and using it to initiate the flow of electrons by extracting them from water molecules through a process called photolysis. The water-splitting and oxygen evolving reaction is catalyzed by photosystem II. While in photosystem I process it generates the reducing power for the reduction of $NADP^+$ to NADPH.

76. The wavelength of light absorbed by Pr form of phytochrome is:-
(a) 620 nm (b) 640 nm
(c) 680 nm (d) 720 nm
AIPMT-2007

Ans. (c) : Phytochrome is basically a type of photoreceptor pigment, it's also help in controlling the flowering.
- Phytochrome are two types.
- Pr types and pfr types.
- Pr is a blue form that absorb red light (wavelength of light 660-680nm). and Pfr is a blue-green form that absorbs far - red light (wavelength of light 730 nm).
- Pr type of light absorb a wavelength 660-680 nm.

77. Phytochrome is present in
(a) vascular cryptogam (b) prokaryotes
(c) flowering plants (d) algae
JIPMER-2008

Ans. (c) : Plants have a blue-green pigment called phytochrome. It is found in almost flowering plants or Angiosperms. Which is utilized to sense light. Acting as a photoreceptor and it controls a number of plant function, including flowering, pigment production, stem growth, and seed germination. It is present in various flowering plants where it helps in the regulation of the time of flowering based on the length of day and night.

78. Phytochrome is a
(a) flavoprotein (b) glycoprotein
(c) lipoprotein (d) chromoprotein
NEET-2016 Phase-II

Ans. (d) : Phytochrome is a chromoprotein, which controls photoperiodism in plants.
- It exist in two forms - P_r and P_{fr} forms. These two forms are interconvertible.
- P_r is a blue form that absorbs red light (660nm) and P_{fr} is a blue-green form that absorbs far-red light (730nm).
- When plants receive red light P_r converts to P_{fr} and vice versa.

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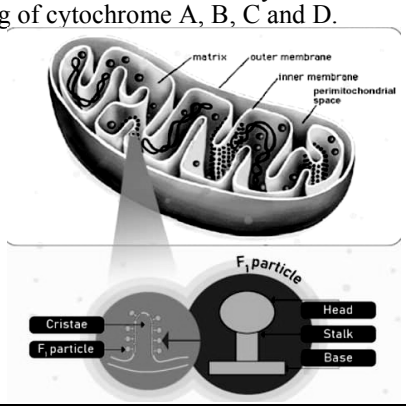
79. Cytochromes are found in :-

(a) Outer wall of mitochondria
(b) Cristae of mitochondria
(c) Lysosomes
(d) Matrix of mitochondria

AIPMT-2015

Ans. (b) : Cytochromes were initially described in 1884 by Macmunn as respiratory pigments. They are found in the **cristae of mitochondria**, cytochrome are a group of proteins involved in redox reaction. They contain Fe containing the heme group at its core. They are involved in the electron transport chain present in the Inner mitochondrial membrane or cristae. The electron transport chain contains two cytochrome complexes consisting of cytochrome A, B, C and D.



80. The size of chlorophyll molecule is

(a) head $15 \times 15 \overset{o}{A}$, tail $25 \overset{o}{A}$
(b) head $20 \times 20 \overset{o}{A}$, tail $25 \overset{o}{A}$
(c) head $15 \times 15 \overset{o}{A}$, tail $20 \overset{o}{A}$
(d) head $10 \times 12 \overset{o}{A}$, tail $25 \overset{o}{A}$

AIPMT-1989

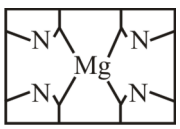
Ans. (c) : Term 'chlorophyll' is used by **Caventoy** consists of a flat or squire head 15 × 15 Å hydrophilic in nature made up of porphyrine ring of tetrapyrol, in which Mg lies in the center and a long tail about 20Å in length, hydrophilic in nature or lipophilic made up of phytol (C_{20} H_{39} OH).
Chlorophyll insoluble in water, green in colour absorb blue and red light of wavelength and reflected or transmit green light.

81. Chlorophyll-a is characterized by the side group

(a) Methyl (b) Aldehyde
(c) Phytol (d) Ketone

MGIMS Wardha-2011

Ans. (a) : Methyl group is an alkyl derived from methane (CH_4), consisting mono carbon atom bonded to these hydrogen atoms, which have chemical formula CH_3.



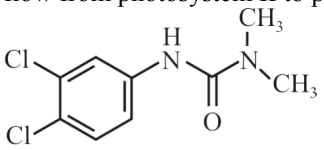
Structure of chlorophyll-a

82. DCMU

(a) inhibits PS-I
(b) inhibits PS-II
(c) destroy chloroplast
(d) inhibits oxidative phosphoryladon

Haryana PMT-2008 /JIPMER-2008

Ans. (b) : DCMU (Dichlorophenyl Dimethyl Urea) is a photosynthesis inhibitor that is very sensitive. If blocks photosystem II plastoquinone binding site, preventing electron flow from photosystem II to plastoquinone.



DCMU

83. Phycobilins absorb light of wavelength

(a) 670 – 700 nm (b) 610 – 650 nm
(c) 500 – 650 nm (d) 520 – 520 nm

BVP-2012

Ans. (c) : Phycobilins are photosynthetic pigments. It is water soluble, blue and red in colour without tail and Mg found in the phycobilisomes, they are also called accessory pigment. Phycobilins are only present in blue green algae & Red algae. So it absorb light of wavelength between 500 - 650 nm.

84. The chemical structure of chlorophyll a varies from chlorophyll b due to difference between

(a) CH_3 and C_2H_5
(b) CH_3 and HCH = CH_2
(c) CH_3 and CHO
(d) CHO and CH = CH_2

J&K CET-2009 / AMU-1996

Ans. (c) : Chlorophyll a and b are two primary types of chlorophyll molecules found in plants. Chlorophyll a has a Methyl group (CH_3) at the third position of the porphyrin ring, while chlorophyll b has an Aldehyde group (– CHO) at the same position. These altering in structure to contribute in the absorbing the different wavelength of light for broader range of energy for photosynthesis.

85. Which fractions of the visible spectrum of solar radiations are primarily absorbed by carotenoids of the higher plants?

(a) Blue and green (b) Green and red
(c) Red and violet (d) Violet and blue

Haryana PMT-2011
AFMC -2011
AIPMT-2003

Ans. (d) : The chloroplasts include a group of yellow-orange pigments known as carotenoids, which mostly absorb blue-green and violet light. As a result, the rate of photosynthesis varies with light wavelength. Carotenoids like-β-corotens, lycopene, and cryptoxanthin etc.

86. Which pigment responsible for photomorphogenetic response ?

(a) Phytochrome (b) Chlorophyll-a
(c) Chlorophyll-b (d) Xanthophyll

Punjab MET-1999

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Ans. (a) : Phytochrome is the pigment responsible for photoperiodism. Phytochrome controls seed germination, initiation of flower and the start of blooming by detecting the presence or absence of light. It is a chromoprotein with a chromophore, a part that detects light, and it has two states: P600 (Pr) and P730 (Pfr).

87. The form of pigment which inhibits germination is

(a) P_{760} (b) P_{730}
(c) P_{650} (d) All of these

BCECE-2007
BHU PMT-2003, 2001

Ans. (b) : The pigment phytochrome behaves the following way:
red wavelengths (650 nm) and far- red wavelengths (730 nm) stimulate and prevent seed germination, respectively.

$$\text{Germination} \leftarrow P_{730} \underset{(650\,nm)\,red\,\lambda}{\overset{far\,red\,\lambda\,(730\,nm)}{\rightleftharpoons}} \rightarrow \text{No germination}$$

88. Chlorophyll molecules are green in colour because they. :

(a) transmit green light
(b) transform green light
(c) reflect green light
(d) absorb green light

Karnataka CET-2002

Ans. (c) : Chlorophyll molecules are green in colour because they do not absorb green light but only reflected.
Chlorophyll absorb blue and red light wavelength from visible spectrum.
Chlorophyll change light energy into chemical energy.
Maximum photosynthesis in white light.
Minimum photosynthesis in green light.

89. Which one of the following does not play any role in photosynthesis?

(a) Phycocyanin (b) Xanthophylls
(c) Phycoerythrin (d) Anthocyanin

DUMET-2010

Ans. (d) : Anthocyanins are colored, water-soluble pigments. Anthocyanins responsible for the colors, red, purple and blue in fruits and vegetables. Phycocyanin, phycoerythrin and Xanthophylls are photosynthetic pigment. There are reserve in different group of plants.

90. The trapping centre of light energy in photosystem-I is:

(a) P – 660 (b) P – 700
(c) P – 680 (d) P – 630

HP CET-2011

Ans. (b) : The trapping centre of light energy in photosystem-I is P-700. It receives electrons from photosystem-II by plastocynine. Thus, in the two photosystems, plastocyanin works as a plug between both photoactors.

91. A small protein attached to the outer surface of the inner membrane and which acts as a mobile carrier for transfer of electrons between complex III and IV is

(a) cytochrome d (b) cytochrome c
(c) cytochrome b (d) cytochrome a

J&K CET-2014

Ans. (b) : Cytochromes are iron-containing pigment found in all green cells in which aerobic respiration is taking place. Cytochrome is a small protein found attached to the outer surface of inner mitochondrial membrane. In the ETS chain, cyt-c transfer one electron from the third complex, cytochrome B, to the complex IV cyt-c.

92. Match the following.

(p) Chlorophyll a	**-**	**(i) Yellow**
(q) Chlorophyll b	**-**	**(ii) Bright or blue green**
(r) Xanthophyll	**-**	**(iii) Yellow – yellow orange**
(s) Carotenoids	**-**	**(iv) Yellow green**

(a) (p) - (2), (q) - (4), (r) - (1), (s) - (3)
(b) (p) - (3), (q) - (4), (r) - (2), (s) - (1)
(c) (p) - (4), (q) - (3), (r) - (2), (s) - (1)
(d) (p) - (4), (q) - (2), (r) - (1), (s) - (3)
(e) (p) - (4), (q) - (1), (r) - (3), (s) - (2)

Kerala PMT-2015

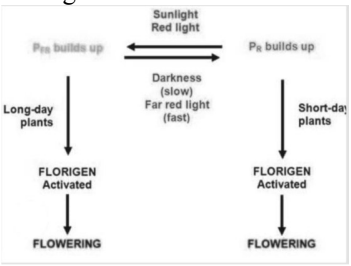
Ans. (a) : (p) Chlorophyll a – Bright or blue green
(q) Chlorophyll b – Yellow green
(r) Xanthophyll – Yellow
(s) Carotenoids – Yellow -yellow orange

93. Phytochrome becomes active in:

(a) green light (b) blue light
(c) red light (d) none of these

VMMC-2002

Ans. (c) : Phytochromes is activated by red light, & Pfr is activated by far-red light, so phytochromes become active in red light.

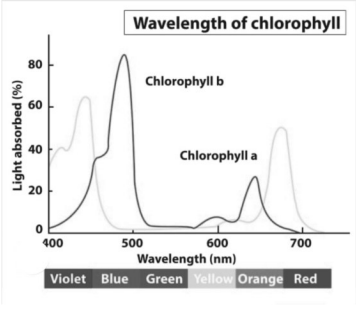


94. Maximum absorption of light occurs in the region of:

(a) 400-700 nm (b) 700-900 nm
(c) 1000-1200 nm (d) 1500 - 2000 nm

JIPMER-2003 / VMMC-2002 /Haryana PMT-2000

Ans. (a) : White light, as it come to us from sun, is composed of waves of different lengths, ranging from longer waves of red light through relatively longer waves and successively shorter waves to violet light, so the visible light wavelength is between 400 and 700nm.



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95. The photosynthetic pigments viz, erythrolable, chlorolable and cyanolable respectively are :

(a) green, red, blue (b) red, blue, green
(c) red, green, blue (d) blue, green, red

JIPMER-2001

Ans. (c) : There are different kinds of cones, each of which can recognize a specific wavelength of light and give us the ability to see color.

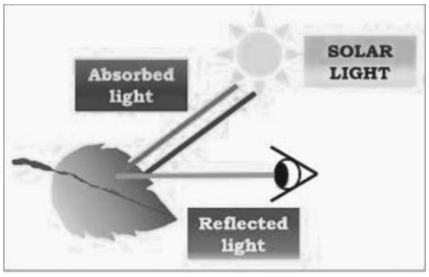
Erythrolabe :– It detects red colour
Chlorolabe :– It detects green colour
Cyanolabe :– It delects blue colour

96. Solarization is

(a) formation of chlorophyll
(b) destruction of chlorophyll
(c) utilization of sunlight
(d) effects of solar light

BHU PMT (Mains)-2008
BHU PMT (Screening)-2005

Ans. (b) : Basically solarization is destruction of chlorophyll. Inhibition of photosynthesis under very high light intensities is known as solarization, and it is mostly caused by the photooxidation of certain molecules like chlorophyll. Chlorophyll is damaged by solarization.



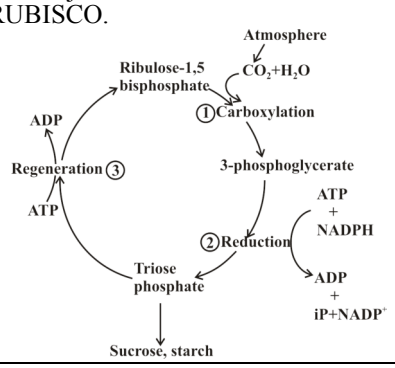
D. Light Reaction

97. Which of the following is the first compound that accepts carbon dioxide during dark phase of photosynthesis?

(a) NADP (b) RuBP
(c) Ferridoxin (d) Cytochrome

Uttarakhand PMT-2008 / J&K CET-2008
BHU PMT-2004 / BVP-2007
Rajasthan PMT-2007 / Manipal-2008

Ans. (b) : In the first step of the **calvin cycle** 6 molecules of CO_2 from the atomsphere bind with the 6 molecule of the RuBP chemical, which has 5 carbons. With the aid of an enzyme known as RuBP, CO_2 molecules are joined to RuBP with the help of an enzyme RUBISCO.



98. Identify the incorrect statements among the following

I. When only PS I is functional, cyclic flow of electrons is not possible
II. The breakdown of the gradient provides enough to make the enzyme synthesis
III. The NADP reductase enzyme is located of the thylakoid membrane
IV. Proton gradient increases due to PC and Cyt f.

(a) I, II, III (b) I, III, IV
(c) II, III, IV (d) I, II, IV

TS EAMCET-10.05.2023, Shift-II

Ans. (b) : The NADP reductase enzyme is located on the outerside of the thylokoid membrane. It is bind with thylokoids at the day time but free in stroma at the night (dark) time.

99. Cyclic photophosphorylation results in the formation of ————

(a) ATP and NADPH (b) NADPH
(c) ATP, NADPH, O_2 (d) ATP

AP EAMCET-12.07.2022 Shift-II

Ans. (d) : Cyclic photophosphorylation occurs in PSI, reaction center P_{700} absorb the light in the form of photon excited high energy electron and ejected from ground state of the molecule moves uphill and accepted by primary electron acceptor (PEP) i.e.- FRS or Fe-S or Fd.

Cyclic photophosphorylation results is the synthesis of ATP with an electron transport system that is activated by photosystems I. It occurs in the stromal lamella. In this process the system converts ADP to ATP for immediate energy for the cells.

100. Identify the substrate level phosphorylation reactions among the following

(A) Triose bis phosphate to triose phosphate
(B) Phosphoglycerate to phosphoenol pyruvate
(C) Succinyl CoA to succinic acid
(D) Malic acid to OAA

Options:

(a) A, B (b) B, C
(c) A, C (d) B, D

TS EAMCET-09.08.2021 Shift-I

Ans. (c) : Substrate-level phosphorylation is a metabolic process that involves the direct transfer of a phosphate group from a substrate to ADP or GDP, producing ATP or GTP as a byproduct. It converting a higher energy product into a lower energy product.

Succinyl-CoA is acted upon by enzyme succinyl-CoA synthetase to from succinate during the kreb's cycle. The reaction releases sufficient energy to form ATP (in plants) or GTP (in animals) by substrate- level phosphorylation. GTP can form ATP through a coupled reaction.

Succinyl CoA + GDP/ADP +

$$H_3PO_4 \underset{\text{synthetase}}{\overset{\text{SuccinylCoA}}{\rightleftharpoons}} \text{succinate} + CoA + GTP/ATP$$

101. During non-cyclic photophosphorylation, when electrons are lost from the reaction centre at PS II, what is the source which replaces these electrons?

(a) Light (b) Oxygen
(c) Water (d) Carbon dioxide

NEET-2020 Phase-II

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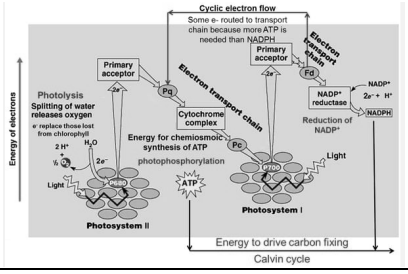
Ans. (c) : During non-cyclic photophosphorylation, electrons expelled by the excited PS-II photocentre do not return to it. Therefore, it requires an external electron donor and that purpose is served by water. H_2O undergo photolysis, and the electrons thus released are picked up by PS-II (P_{680}) and handed to PS-I (P_{700}). The non cyclic flow of electron is called – Z- scheme.



102. The deficiency of which of these elements interrupts photolysis of water during photosynthesis?

(a) Mn and C*l* (b) Zn and Cu
(c) Ca and K (d) N and P

Karnataka CET-2020

Ans. (a) : Mn (Manganese) and C1 (Chlorine) deficits may prevent water from being photolyzed during photosynthesis. Photolysis is the term used to describe the splitting of water molecules in the presence of light.

103. Dark reaction

(a) in light
(b) in dark
(c) requires product of light reaction
(d) All of the above

JIPMER-2019

Ans. (c) : Plants make glucose in the dark reaction by combining carbon dioxide with ATP and NADPH from the light reaction. It happens in the chloroplast's stroma. Since dark reactions don't need light, they don't necessarily happen at night. It just needs light reaction byproducts like ATP and NADPH.

104. Which of the following is not a product of light reaction of photosynthesis?

(a) ATP (b) NADH
(c) Oxygen (d) NADPH

NEET-2018

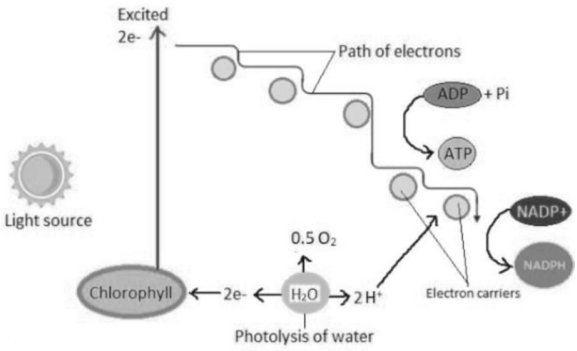
Ans. (b) : During the light reaction process many products are formed i.e., ATP, NADPH, and oxygen, while NADH is formed during respiration. The ATP and NADPH from light-dependent reaction are used to make sugar in the calvin cycle.
In another form of light reaction called cyclic photophosphorylation, electrons follow circular path, producing only ATP.
Note: Some time student may confused between NADH and NADPH, so NADH is mainly involved in catabolic process while NADPH is involved in anabolic process.
NADH is involved in respiration, whereas NADPH is involved in synthesis of carbohydrates.

105. The products of light reaction during photosynthesis include

(a) ATP and NADPH (b) O_2 and $NADP^+$
(c) O_2 and H_2O (d) $NADP^+$ and H_2O

KVPY (SA)-05.11.2017

Ans. (a) : The products of light reaction during photosynthesis include ATP and NADPH. The by product of light reaction in photosynthesis are ATP (adenosine triphosphate) and NADPH (nicotinamide adenine dinucleotide phosphate) these energy rich molecule are essential for the subsequent dark reaction (Calvin cycle) in production glucose and other carbohydrates.



Non-cyclic Photophosphorylation

106.

In this process which of the following play important role?

(a) Chlorophyll (b) Light energy
(c) Ca^{++}, Mn^{++}, Cl^- (d) All of the above

GUJCET-2015

Ans. (d) : Water undergoes photolysis, which is a crucial step in the light response of photosynthesis. As a by product, water generates H^+ ions, which decrease CO_2 to make glucose and O_2. Chlorophyll and light energy, as well as the presence of the ions Ca^{2+}, Mn^{2+}, and Cl^-, are necessary for photolysis to occur.

107. Which one of the following statements about the events of noncyclic photophosphorylation is NOT correct ?

(a) ATP and NADPH are not produced.
(b) Only one photosystem participates
(c) O_2 is released.
(d) Photolysis of water takes place.

Karnataka CET-2010

Ans. (b) : In non-cyclic photophosphorylation, electron derived from the photolysis of water are arise to higher energy level in PS-I and PS-II and pass along the electron transport chain carrier molecule to NADP reductase. This enzyme transfers electron to NADP to make $NADPH_2$, which provide reducing power for the light-dependent reaction of photosynthesis.

108. The organelles, those take part in photorespiration are

(a) chloroplast and mitochondria
(b) chloroplast, mitochondria and peroxisome
(c) mitochondria and peroxisome
(d) mitochondria only

JIPMER-2012
UP CPMT-2005

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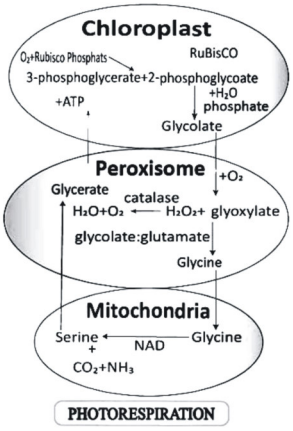
Ans. (b) : The organelles, those take part in photorespiration are chloroplast, mitochondria and peroxisome.



109. The microelement, which is an integral part of the electron carrier which transfers electrons for cyt-b-f complex to PS-I is a component of

(a) Nitrate reductase
(b) Cytochrome-'C'-oxidase
(c) IAA oxidase
(d) Dinitrogenase

AP EAMCET-2013

Ans. (b) :

- **Cytochrome-'C'oxidase**-Cytochrome C- Oxidase (CCO) is a respiratory energy- transducing enzyme. It catalyzes electron transfer from cytochrome to molecular oxygen, conserving the released energy as a charge and proton gradient across the membrane in which it is located.
- **Nitrate reductase**: Nitrate reductase is molybdous enzymes that reduce nitrate to nitrite. This reaction is critical for the production of protein in most crop plants, as nitrate is the dominant source of nitrogen in fertilized soils.
- **IAA oxidase**: IAA is the main auxin in plants, regulating, growth and developmental processes such as cell division and elongation. Tissue differentiation, apical dominance, and response to fight gravity and pathogens.
- **Dinitrogenase** : Nitrogenases are enzymes that are produced by certain bacteria, such as cyanobacteria and rhizobacteria. These enzymes are responsible for the reduction of nitrogen to ammonia. Dinitrogenase reductase transfers electrons from and electron donor to dinitrogenase, which can catalyze the reduction of nitrogen to ammonium. Because nitrogen fixation is an energy-demanding process, it is tightly regulated in response to several environmental factors.

110. The synthesis of one molecule of glucose during Calvin cycle requires

(a) 12 molecules of ATP and 18 molecules of $NADPH_2$
(b) 6 molecules of ATP and 12 molecules of $NADPH_2$
(c) 18 molecules of ATP and 12 molecules of $NADPH_2$
(d) 12 molecules each of ATP and $NADPH_2$

Karnataka CET-2006

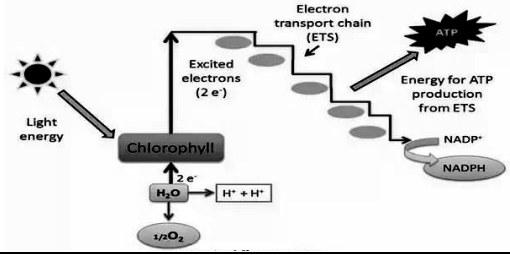
Ans. (c) : The synthesis of one molecule of glucose during Calvin cycle requires 18 molecules of ATP and 12 molecules of $NADPH_2$.

111. In Photosynthesis energy from light reaction to dark reaction is transferred in the form of : -

(a) ADP (b) ATP
(c) RUDP (d) Chlorophyll

AIPMT-2002

Ans. (b) : The energy currency is ATP. Assimilatory power is the ability of plants to produce food in the form of carbohydrates from the reduction of CO_2 during photosynthesis in the form of ATP and NADPH.



112. Two different species cannot live for long duration in the same niche or habitat. This law is

(a) Allen's law
(b) Gause's law
(c) Competitive exclusion principal
(d) Weiseman's theory

AIPMT-2002

Ans. (c) : Competitive exclusion principal stats that two species completing for the same limited resources in the same ecological nicks cannot coexist indefinitely.
One species will eventually out compete and displace the other, leading to the exclusion of the less adapted species. This principle helps explain patterns of species distribution and abundance in ecosystems.

113. Dark reactions of photosynthesis occur in

(a) granal thylakoid membranes
(b) stromal lamella membranes
(c) stroma outside photosynthetic lamellae
(d) periplastidial space.

AIPMT-1991

Ans. (c) : Dark reaction also called 'Blackman reaction' discovered by 'F.F Blackman'. Dark reaction is a series of reactions that include CO_2 fixation, reducing the resultant molecule to make glucose and regenerating the carbon-fixing substrate. It occurs in stroma of chloroplast, outside of photosynthetic lamellae. It occurs in absence of light. CO_2 reduced to form the carbohydrate which is stored in the form of starch. It is the fixation of CO_2 or Assimilation of CO_2.

114. Ferredoxin is a constituent of

(a) PS I (b) PS II
(c) Hill reaction (d) P_{680}

AIPMT-1991

Ans. (a) : Ferredoxin (Fd) is a soluble protein which act as an electron carrier. It is an iron-sulphur containing protein present on the stromal side of the thylakoid membrane. It is a component of PSI.
PSI absorbs both wave length of light above 680 nm and below 680 nm. The reaction center of the photo system is P_{700} and carotenoids. Its occurs on outer surface of thylakoid membrane.

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115. Quantum yield of photosynthesis is :
(a) 33% (b) 9%
(c) 12% (d) 8%

Haryana PMT-2004
Manipal-2003

Ans. (c) : The quantum yield of photosynthesis (ϕ) is a definitive measure of the energetic efficiency of photoautotrophy. The rate or yield of photosynthesis is measured by the number of oxygen molecules produced per quantum of light absorbed. This is called quantum yield. Hence the quantum yield is 12% in C_3 plants.
Number of quanta of light required for evolution of one molecule of O_2, 8 quanta are required

$$= \frac{1}{8} = \cdot 125 = 12.5$$

116. During light reaction of photosynthesis which of the following phenomenon is observed during cyclic phosphorylation as well as non-cyclic phosphorylation:
(a) release of O_2
(b) formation of ATP
(c) formation of NADPH
(d) involvement of PS-I and PS-II

DUMET-2001

Ans. (b) : In cyclic phosphorylation, electrons released from P700 cyclically return to P700. ATP is synthesized during electron flow. The formation of ATP during the oxygen-releasing process of photosynthesis is called non-cyclic photophosphorylation.

117. Dark reaction in photosynthesis is called so because
(a) It does not depend on light energy
(b) It can occur in dark also
(c) It cannot occur during day light
(d) It occurs more rapidly at night

CMC Ludhiana-2014

Ans. (a) : The dark reaction also called as Blackman's reaction. It occurs in stroma of chloroplast where all enzymes necessary for CO_2 reduction and the synthesis of sugar & starch are located. It does not require the light.

118. Hill reaction was demonstrated
(a) in the absence of water
(b) in the absence of carbon dioxide
(c) in the presence of carbon dioxide
(d) in the absence of a suitable electron acceptor.

AMU-1996

Ans. (b) : Light reaction discovered by 'Robert Hill' therefore called 'Hill reaction' which is light dependent phase.
Hill demonstrated photolysis of water by isolated chloroplasts in the presence of light and suitable electron acceptor and showed the production of O_2 even if CO_2 was absent. Hence, Hill reaction was demonstrated in the absence of CO_2.

119. The radiation energy of light is converted to chemical energy and stored as
(a) AMP (b) ADP
(c) ATP (d) APP

Manipal-2010

Ans. (c) : Photosynthesis is the process of utilizing light or solar energy into chemical energy. Sunlight is absorbed by chlorophyll of leaves. ATP molecules are formed when light energy is transformed into chemical energy. The light dependent reaction is a photochemical reaction taking place in the thylakoid membranes of chloroplasts, where light energy is transformed into adenosine triphosphate (ATP).

120. Which of the following is synthesized in the dark-reaction of photosynthesis?
(a) $NADPH_2$ (b) ATP
(c) Oxygen (d) PGA

AMU-2002

Ans. (d) : Photosynthesis occurs in two phase: the light reaction and dark reaction. The formation of PGA occurs in the dark reaction of photosynthesis. It is a 3-carbon compound, which is the first stable product of the calvin cycle. Light reaction occurs in grana thylakoids. Dark reaction occurs in the stroma of chloroplasts. Light reaction is the initial stage of photosynthesis which traps light energy to produce ATP and NADPH.

121. The first step in dark reaction of photosynthesis is
(a) formation of ATP
(b) ionisation of water
(c) attachment of CO_2 to a pentose sugar
(d) excitement of electron of chlorophyll by a photon of light.

MGIMS Wardha-2004
UP CPMT-2004

Ans. (c) : We know that the first step in the dark reaction of photosynthesis is attachment of carbon dioxide to a pentose sugar. The CO_2 taken in by the plant combines a 5-carbon compound known as ribulose 1, 5 bi-phosphate with two molecules of 3-phosphoglycerate. This step is catalyzed by the enzyme ribulose biphosphate carboxylase.

122. In photosynthesis what occurs in PS-II
(a) It takes longer wavelength of light and e^- from H_2O
(b) It takes shorter wavelength of light and e^- from H_2O
(c) It takes longer wavelength of light and e^- from NADP
(d) It takes shorter wavelength of light and e^- NADP

BHU PMT-2003
JIPMER-2005

Ans. (b) : Pigments of PS-II reaction center, chlorophyll P_{680} absorb maximum 680 nm wavelength light, electrons are released from this system, and thus chlorophyll molecules get oxidised. Four electrons are extracted from two molecules of water with the release of O_2 and $4H^+$ into thylakoid lumen .

$$2H_2O \xrightarrow{Mn^{2+}} 4H^+ + 4e^- + O_2$$

123. A sleep movement is a nastic response that occurs daily in response to:
(a) dark (b) light
(c) both (a) and (b) (d) none of these

VMMC-2006

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Ans. (c) : The term "nastic response" refers to the daily response of the body to a stimulus such as light, temperature, pH, or other factors. Nastic movements refers to the non-directional movements of plants that occur due to turgor changes.

124. PS-I and PS-II were discovered by

(a) Robert Emerson (b) Blackman
(c) Robert Mayer (d) Arnon

Haryana PMT-2007

Ans. (a) : The photosystem I and photosystem II was discovered by 'Robert Emerson' and 'William Arnold' in the 1950 by using green algae (chlamydononas).
'Blackman' suggested that photosynthesis is a two-step process. 'Arnon' discovered and named photosynthetic phosphorylation.

125. Autoradiography technique was used to

(a) trace the path of carbon in photosynthesis
(b) establish that the oxygen evolved during photosynthesis is by photolysis of water molecule
(c) study photorespiration in certain plants
(d) find out the absorption maximum of chlorophyll pigments

VMMC-2005
AMU-2004

Ans. (a) : In California, USA, Calvin, Benson, and other researchers discovered to calvin cycle. They gave radioactive C-14 in isotope, CO_2 on the experiment of chlorella. The half-life of radioactive carbon, C-14, is 5568 years. Consequently, with its aid, the route of fixation during photosynthesis can be identified and found carbon dioxide uptake, carbon fixation, reduction etc. Hence, autoradiography technique was used to trace the path of carbon in photosynthesis.

E. Transport of Electron

126. _____element is a component of Ferridoxin

(a) Zinc (b) Iron
(c) Magnesium (d) Copper

AP EAMCET-11.07.2022 Shift-II

Ans. (b) : Iron is a essential component of Ferredoxin. Ferredoxin is a group of iron-sulfur proteins that mediate electron transfer in a wide variety of metabolic reactions. Ferredoxins are the proteins that function primarily in photosynthesis.

127. Assertion (A) : Electrons released from photo system are used by electron transport chain during photophospherylation.
Reason (R) : Movement of electrons from pheophytin to PSI reaction centre is an oxidation reduction reaction.
The correct option among the following is :

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A) is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-II

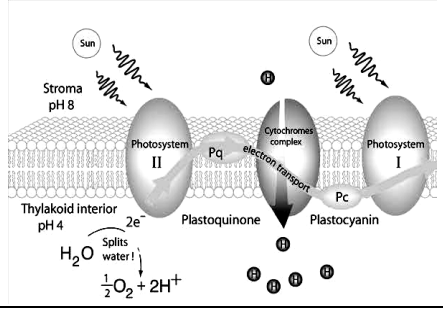
Ans. (a) : Photophosphorylation is the conversion of ADP to ATP using the energy of sunlight through the activation of PSII. An electron transport chain consist of a series of redox reaction that sequentially proceed to transfer electrons from a high-energy molecule (the donor) to a lower-energy molecule (the acceptor).

128. In light reaction, plastoquinone facilitates the transfer of electrons from

(a) $Cytb_6f$ complex to PS-I
(b) PS-I to $NADP^+$/ PS-I से $NADP^+$
(c) PS-I to ATP synthase
(d) PS-II to $Cytb_6f$ complex

NEET-2020 Phase-I

Ans. (d) : Plastoquinone (PQ) helps transfer electrons from photosystemII (PS-II) to the cytochrome b_6f complex in the light reaction of photosynthesis . This process involves the reduction of PQ and the subsequent movement of electron through the cytochrome b_6f complex, creating a proton gradient that drives ATP synthesis through ATP synthase. This electron transfer helps in power the generation of energy rich molecules like ATP and NADPH, which are vital for the process of photosynthesis.



129. Match the items given in Column I with those in Column II and select the correct option given below :

	Column-I		Column-II
(A)	Eutrophication	(i)	UV-B radiation
(B)	Sanitary landfill	(ii)	Deforestation
(C)	Snow blindness	(iii)	Nutrient enrichmen
(D)	Jhum cultivation	(iv)	Waste disposal

	(A)	(B)	(C)	(D)
(a)	ii	i	iii	iv
(b)	i	iii	iv	ii
(c)	i	ii	iv	iii
(d)	iii	iv	i	ii

NEET-2018

Ans. (d) :

Eutrophication	—	Nutrient enrichment
Sanitary landfill	—	Waste disposal
Snow blindness	—	UV-B radiation
Jhum cultivation	—	Deforestation

- **Eutrophication** is nutrient enrichment.
- **Sanitary land fill** is method of solid waste disposal in which waste material buried in pits.
- **Snow blindness** caused by UV-B radiation.
- **Jhum cultivation** mainly practiced in north east state of India in which land is cultivated temporarily and then abundant so it can be revert to its natural regulation.

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130. Populations are said to be sympatric when------.

(a) Two populations are physically isolated by natural barriers.
(b) Two populations live together and freely interbreed to produce sterile offspring.
(c) Two populations share the same environment but cannot interbreed.
(d) Two populations are isolated but occasionally come together to interbreed.

Karnataka CET-2010

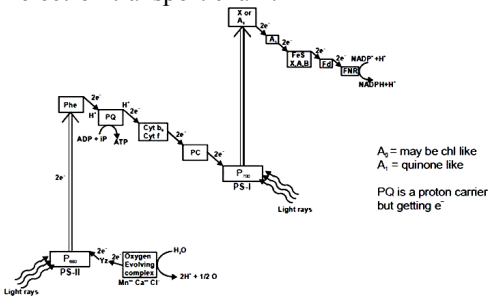
Ans. (c) : Populations are said to be sympatric when two populations share the same environment but cannot interbreed. Sympatric speciation is a phenomenon in which an ancestral population evolves to form separate species in the same habitat. Over time these populations will form new species which means that the two populations will not be able to interbreed and there is no gene flow between the populations.

131. Electrons from excited chlorophyll molecule of photosystem II are accepted first by:

(a) Quinone (b) Ferredoxin
(c) Cytochrome-b (d) Cytochrome-f

AIPMT-2008

Ans. (a) : Quinone is the first compound to take electrons from an energized photosystem II chlorophyll molecule. Ferredoxin serves as an electron transfer agent in biological redox processes. .
Cytochrome-b and cytochrome-f both play a important role in electron transport chain.



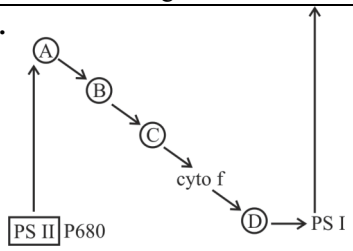
132. Both photosynthesis and respiration require

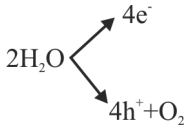
(a) Mitochondria (b) Sunlight
(c) Chloroplasts (d) Cytochromes

Karnataka CET-2006

Ans. (d) : Cytochromes are essential for respiration and photosynthesis. It was described by Charles Alexander Macmunn as respiratory pigment in 1884. Electron transfer occurs during both respiration and photosynthesis across several electron carriers ensconced in the inner mitochondrial membrane and thylakoid membrane, respectively. Iron-containing proteins called cytochromes produce ATP through the transfer of electrons.

133.



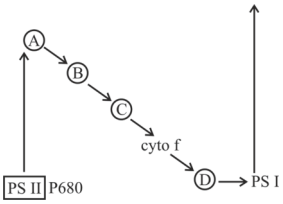


In the above schematic diagram, which is plastocyanin?

(a) A (b) B
(c) C (d) D

Karnataka CET-2007

Ans. (d) :



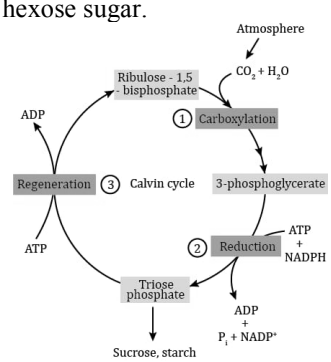
In the given schematic diagram, D is representing plastocyanin.
Hence the correct answer is option 'd'.

134. For the synthesis of one glucose molecule the calvin cycle operates for:

(a) 2 times (b) 4 times
(c) 6 times (d) 8 times

AIPMT-2000

Ans. (c) : The calvin cycle involves the fixation of carbon dioxide. The calvin cycle has three steps, including carbon fixation, reduction, and regeneration. One carbon dioxide molecule is fixed by one calvin cycle turn. One glucose molecule requires the production of six carbon atoms. Consequently, the calvin cycle must complete six rotations to create one molecule of hexose sugar.



135. Which is wrong for cytochrome P–450

(a) It contains Fe
(b) It concern with oxidation
(c) It is a pigment
(d) It is a coloured cell

AIPMT-1998

Ans. (d) : Iron-containing hemoproteins called cytochromes, are crucial to heme groups that are primarily in charge of producing ATP through electron transport,. Therefore, it is inappropriate for cytochrome P-450 is a colored cell.

136. Which of the following biomolecules is common to respiration-,mediated breakdown of fats, carbohydrates and proteins?

(a) Glucose-6-phosphate

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(b) Fructose 1,6 bisphosphate
(c) Pyruvic acid
(d) Acetyl CO-A

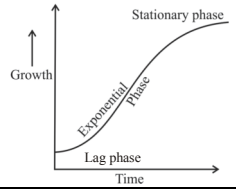
NEET-2016 Phase-II

Ans. (d) : Acetyl CO-A is the common metabolite that arise from respiratory breakdown of carbohydrates, lipid and proteins. Fructose-6-phosphate and glucose 6 phosphate does not arise from fats and proteins. Pyruvic acid may or may not arise from fats and proteins.

137. Typical growth curve in plants is:-
(a) Linear (b) Stair-steps shaped
(c) Parabolic (d) Sigmoid

AIPMT-2015

Ans. (d) : Typical growth curve in plants is sigmoid.
• Sigmoid growth curve is shown below–



138. In the electron transport chain, in terminal oxidation, the cytochrome, which donates electrons to O_2 is
(a) Cytochrome-b (b) Cytochrome-c
(c) Cytochrome-a_3 (d) Cytochrome-a

MGIMS Wardha-2009

Ans. (c) : Cytochrome – a_3 is responsible for transferring the electrons to molecular oxygen and it is participate in the reduction of O_2 to form water, This cytochrome is a part of complex IV (also known as cytochrome c oxidase), the last complex in the electron transport chain.

139. Cytochrome oxidase is a/an
(a) exoenzyme (b) endoenzyme
(c) proenzyme (d) coenzyme

Haryana PMT-2008

Ans. (b) : Cytochrome oxidase is an integral membrane protein located in the inner mitochondrial membrane and it's classified as endoenzymes. It also play an important role in the electron transport chain, facilitating the transfer of electron to molecular oxygen (O_2) as part of the terminal step, resulting in the production of water.

140. Last electron acceptor in respiration is:
(a) CO_2 (b) O_2
(c) H_2 (d) NADH

Rajasthan PMT-2006

Ans. (b) : Oxygen is terminal electron acceptor. The process is called respiration, specifically aerobic respiration. When we breath oxygen, it diffuses into the mitochondria of cell, where it is used as the final acceptor of electrons from electron transport chain. It finally leads to the formation of water and the production of ATP.

141. Cu is present in
(a) plasmalemma (b) plastoquinone
(c) plastocyanin (d) ferridoxin

UP CPMT-2003

Ans. (c) Copper (Cu) is present in plastocyanin, a protein found in the thylakoid membrane of chloroplasts. Plastocyanin act as an electron carrier in photosynthesis, shuttling electron between the cytochrome complex and photosystem I.

142. Photosynthetic evolution of oxygen requires
(a) Coenzyme (b) Fe-enzyme
(c) Mn-enzyme (d) Zn-enzyme

CG PMT-2009

Ans. (c) : Manganese is required for the photosynthetic evolution of oxygen. Mn plays a vital role in the oxygen-evolving complex of photosynthesis; four atoms are required to split water.

143. The final electron acceptor in pseudocyclic electron transport in chloroplast is
(a) $NADP^+$ (b) Ferredoxin
(c) oxygen (d) NAD^+

CG PMT-2009

Ans. (a) : The non-cyclic electron pathway has distinct steps that the electrons pass through. Water is first photolyzed, and two electrons from this process travel through the electron transport molecules of the cytochrome complex and photosystem I. Which then send it to the NADP, and it serves as the last electron acceptor.

F. Chemosmotic Hypothesis

144. The Chemiosmotic coupling Hypothesis of oxidative phosphorylation proposes that Adenosine Tri-Phosphate (ATP) is formed because
(a) A proton gradient forms across the inner membrane
(b) There is a change in the permeability of the inner mitochondrial membrane toward Adenosine Di-Phosphate (ADP)
(c) High energy bonds are formed in mitochondrial proteins
(d) ADP is pumped out of the matrix into the intermembrane space

AIIMS-2016 / AIPMT-2008

Ans. (a) : Electron transporters found in the **inner mitochondrial membrane** aid in the oxidative phosphorylation process inside mitochondria. In addition to creating a chemical gradient, the mitochondrial electron transport system also creates an electrochemical gradient when protons are released into the peri-mitochondrial region.

145. Assertion (A) True xerophytes store water in the form of mucilage which helps to withstand prolonged period of drought.
Reason (R) Vascular and mechanical tissues are well developed in true xerophytes.
The correct answer is
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) Only (A) is true, but (R) is not true
(d) (A) is not true but (R) is true

AP EAMCET-2009

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Ans. (d)) : Plants that have evolved to exist in dry condition called xerophytes. They have well-developed vascular and mechanical tissues to take full advantage of conditions of water stress are common adaptation to minimize the rate of transpiration.

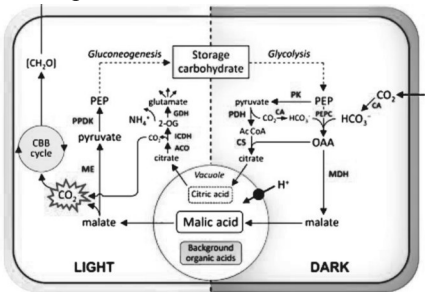
They have a thick, waxy cuticle that prevents evaporation. Sunken stomata retain wet air to slow the rate of evaporation. Hairs on the inner surface of folded leaves with stomata help trap moist air and decrease transpiration.

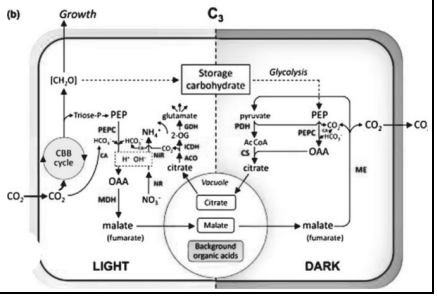
146. In CAM plants, CO_2 acceptor is

(a) RuBP (b) PEP
(c) OAA (d) PGA

BHU PMT (Screening)-2007

Ans. (b) : In CAM plants, CO_2 acceptor is PEP CAM plants are also known as Crassulacean Acid Metabolism. Phosphoenol pyruvic acid (PEP) is the CO_2 acceptor in CAM plants at night, whereas ribulose bisphosphate is the acceptor during the day. Oxalo acetic acid (OAA) is the first stable product in the case of CAM plants.



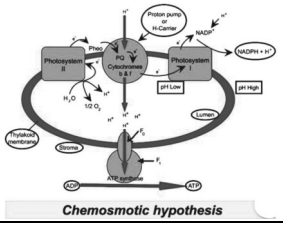


147. Chemiosmotic mechanism of ATP production in aerobic respiration was given by:

(a) Krebs (b) Calvin
(c) Hatch and Slack (d) Peter Mitchell

AFMC-2004

Ans. (d) : According to Peter Mitchell's "chemiosmotic hypothesis," ATP can be produced by utilizing an electrochemical gradient of protons across a membrane.



G. C_3 and C_4 Pathway

148. What will be the number of Calvin cycles to generate one molecule of hexose?

(a) 8 (b) 9
(c) 4 (d) 6

MHT CET-06.10.2020 Shift-I / Haryana PMT-2010
AFMC-2007 / AIPMT-1996

Ans. (d) : Calvin cycle occurs in all photosynthetic plant it does not matter whether they have C_3 or C_4 path ways. There are 6 atoms of carbon required for the synthesis of one glucose molecule, Hence, to produce one molecule of hexose sugar, 6 turns of Calvin cycle are required.

149. Which one of the following contain agranal Chloroplast ?

(a) C_3 plants (b) Succulants
(c) C_4 plants (d) Hydrophytes

BVP-2012 / BCECE-2011
MGIMS Wardha-2007 / Haryana PMT-1999

Ans. (c) : The C_4 plants contain agranal chloroplasts. Bundle sheath cell of C_4 plants contain larger chloroplasts in size and arranged centripetally and also contain starch granule but lack grana. This is the reason there chloroplasts are agranal as they lack grana where as is mesophyll cells there are smaller chloroplasts with well developed grana.

150. Calvin cycle occurs in :

(a) cytoplasm (b) chloroplasts
(c) mitochondria (d) glyoxysomes

Tripura JEE-2017 / BCECE-2003
BVP-2002 / Rajasthan PMT-1997

Ans. (b) : The conversion of carbon dioxide into glucose takes place through a light dependent reaction, also called the Calvin cycle. It is performed in the stroma of the chloroplast.

Calvin cycle occurs in both C_3 plant and C_4 plant. In C_3 plant it occurs in mesophyll cell but in C_4 – plant takes place in bundle sheath cell.

151. The reaction commonly involved in calvin cycle and acrobic respiration
I. Phophorylation
II. Condensation
III. Carboxylation
IV. Dephosphorylation

(a) I, II, III (b) I, III, IV
(c) I, II, IV (d) II, III, IV

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : The reaction commonly involved in aerobic respiration and calvin cycle are phosphorylation, condensation, dephosphorylation.

- Calvin cycle discovered by M. Kalvin and A. VENSON discoverd the path of corbon.
- M. KALVIN and A VENSON used this cycle in experiment chlorella algae.

152. In the photosynthesis of C_4 plants the first 4 carbon compound is formed by the following reaction

(a) Decarboxylation of pyruvic acid
(b) Carboxylation of PEP
(c) Oxidation of malic acid
(d) Oxidative decarboxylation of malic acid

TS EAMCET 10.05.2023 Shift-I

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Ans. (b) : In the photosynthesis of C_4 plants, the first 4 carbon compound is formed by the carboxylation of PEP (Phosphoenolpyruvate). PEP carboxylase is an enzyme that attaches a carbon dioxide molecule to PEP, forming oxaloacetate, a 4 carbon compound. Oxaloacetate then transported to bundle sheath cells, where it is decarboxylated to release CO_2 and calvin cycle.

153. To reduce 1 CO_2 in C_3 Cycle assimilatory power needed is

(a) 2 ATP + 3 $NADPH+H^+$
(b) 6 ATP + 2 $NADPH+H^+$
(c) 5 ATP + 2 $NADPH+H^+$
(d) 3 ATP + 2 $NADPH+H^+$

TS EAMCET 10.05.2023 Shift-I

Ans. (d) : The assimilatory power needed to reduce 1 CO_2 in the C_3 cycle is 3 ATP and 2 $NADPH_2$. This is because the calvin cycle requires ATP to power the reactions and NADPH to provide the electrons needed to reduce the CO_2 molecules.

154. Primary CO_2 acceptor in C_4 plants

(a) Phosphoenol pyruvic acid
(b) Ribulose 1,5 bis phosphate carboxylase
(c) Oxalo acetic acid
(d) Phospho glyceric acid.

AP EAPCET-23.05.2023, Shift-II

Ans. (a) : Phosphoenolpyruvic acid (PEP) is the primary CO_2 acceptor in C_4 plants.
In C_4 plants, the first step of carbon fixation is the carboxylation of PEP by the enzyme PEP carboxylase. This reaction produces 4 carbon containing substance oxaloacetic acid.

- Ribulose 1,5-bisphusphate carboxylase (RUBP) is the primary CO_2 acceptor in C_3 plants.
- Phospho Glyceric Acid (PGA) is a product of the calvin cycle.

155. Assertion (A) : C_4 plant loses only half of the water compared to C_3 plant for the same amount of CO_2 fixed,
Reason (R) : C_4 photosynthetic system is evolved for maximizing the availability of CO_2 while minimizing water loss

(a) Both A and R are correct, R is the correct explanation for A.
(b) Both A and R are correct, but R is not the correct explanation for A.
(c) A is correct but R is incorrect.
(d) A is incorrect but R is correct.

AP EAPCET-22.05.2023, Shift-II

Ans. (a) : C_4 plants loses only half of the water compared to C_3 plants for the same amount of CO_2 fixed. In C_3 plants, CO_2 is fixed directly into Rubisco, an enzyme that is also responsible for fixing O_2.
C_4 plants have evolved a way to avoid photorespiration by fixing CO_2 into a 4-carbon compound called oxaloacetate in the mesophyll cells of their leaves.

156. Given below are two statements :
Statement I : RuBisCO is the most abundant enzyme in the world.
Statement II : Photorespiration does not occur in C_4 plants
In the light of the above statements, choose the most appropriate answer from the options given below:

(a) Both statement I and Statement II are correct
(b) Both Statement I and Statement II are incorrect
(c) Statement I is correct but Statement II is incorrect
(d) Statement I is incorrect but Statement II is correct

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : RuBisCO or ribulose 1,5 bisphosphate carboxylase/oxygenase is universally occurring enzyme of all photosynthetic plant except few photosynthetic bacteria.

- According to Ellis (1979) it is the most abundant protein on earth.
- Respiration that is initiated in chloroplasts and occurs in light only is called photorespiration. It occurs in Calvin cycle during plant metabolism. In this process RuBisCO is responsible for fixing of CO_2 reacts with oxygen rather than CO_2.

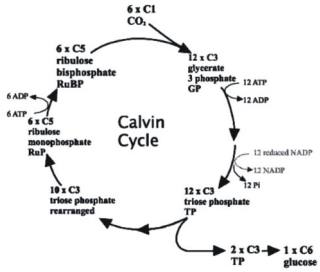
157. How many ATP and $NADPH_2$ are required for the synthesis of one molecule of Glucose during Calvin cycle?

(a) 18 ATP and 16 $NADPH_2$
(b) 12 ATP and 12 $NADPH_2$
(c) 18 ATP and 12 $NADPH_2$
(d) 12 ATP and 16 $NADPH_2$

NEET (UG) 07.05.2023

Ans. (c) : Calvin cycle is a series of biochemical redox reactions that takes place in the stroma of chloroplast in photosynthetic organisms.
Calvin cycle was discovered in 1950 by Melvin Calvin James Bassham and Andrew Benson at the university of california by using radioisotope carbon - 14

- Calvin cycle is also known as the C_3 cycle. It is a chemical reactions where the carbon from the carbon cycle is fixed into sugars. It occurs in the chloroplant of the plant cell.
- Calvin cycle operate 6 time for fix one molecule of glucose.
- For one turn ATP used = 3 molecules NADPH used = 2 molecule thus for 6 cycles = 10 ATP molecules and 12 NADPH molecules used.



158. What is the role of large bundle sheath cells found around the vascular bundles in C_4 plants?

(a) To protect the vascular tissue from high light intensity

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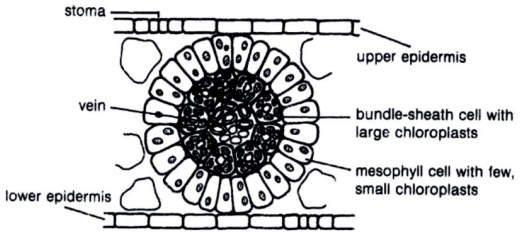
(b) To provide the site for photorespiratory pathway
(c) To increase the number of chloroplast for the operation of Calvin cycle
(d) To enable the plant to tolerate high temperature

NEET-2022

Ans. (c) : In C_4 plants, the bundle sheath cells play a particularly unique role in the photosynthetic fixation of CO_2, where they create a specialized compartment that allows CO_2 to be concentrated around RuBisCO, and also to increase the number of chloroplast for the operation of Calvin cycle.



159. Given below are two statements

Statement I : The primary CO_2 acceptor in C_4 plants is phosphoenolpyruvate and is found in the mesophyll cells.

Statement II : Mesophyll cells of C_4 plants lack RuBisCo enzyme. In the light of the above statements, choose the correct answer from the options given below:

(a) Statement I is incorrect but Statement II is correct
(b) Both Statement I and Statement II are correct
(c) Both Statement I and Statement II are incorrect
(d) Statement I is correct but Statement II is incorrect

NEET-2022

Ans. (b) : The primary CO_2 acceptor is a 3-Carbon molecule, Phosphoenol Pyruvate (PEP) and is present in the mesophyll cells.

• Mesophyll cells of C_4 plants lack RuBisCO enzymes. In C_4 plants, RuBisCO enzyme is found in the bundle sheath cell.

So, the both statement I and statement II correct.

160. When one CO_2 molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase?

(a) 1 ATP + 1 NADPH (b) 1 ATP + 2 NADPH
(c) 2 ATP + 1 NADPH (d) 2 ATP + 2 NADPH

NEET (Re-Exam)-04.09.2022

Ans. (d) : For fixing one molecule of CO_2 in the Calvin cycle 3 ATP and 2 NADPH are required.

The Calvin cycle comprises three main steps :

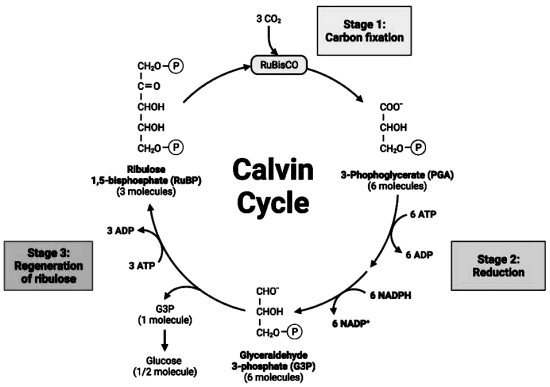
Carbon Fixation - In this step, a CO_2 molecule binds with Ribulose -1, 5-biphosphate (RuBP), which is an acceptor molecule, the binding results in the formation of a six carbon compound that eventually splits to form two molecule of 3 carbon compound each known as 3-phosphoglyceric acid (3 PGA).

Reduction-In this step, one molecule of 3-PGA is converted into Glyceraldehyde-3-phosphate (G-3-P).

This reaction is facilited by 1-ATP and 1-NADPH.

So, when two molecule 3-PGA are converted into 2-molecule of Glyceraldehyde-3-phosphate (G-3-P), 2-ATP and 2-NADPH are utilized.

Regeneration:-It is complex process that requires ATP. In this stage some Glyceraldehyde-3 phosphate molecules are used to produce glucose, while others are recycled to regenerate the RuBP acceptor.



161. Identify the differences between C_3 and C_4 plants among the following characters

(A) Photorespiration rate
(B) Activity of RuBisCO
(C) Type of light reactions
(D) CO_2 primary acceptor from atmosphere
(E) Anatomy of the leaf

Options:

(a) A, B, C (b) B, C, D
(c) C, D, E (d) A, D, E

TS EAMCET-09.08.2021 Shift-I

Ans. (d) :

	C_3 plant (calvin cycle)	C_4 plants (Hatch and slack cycle)
Photorespiration rate	High	Absent
CO_2 primary acceptor from atmosphere	RuBP	PEP carboxylase
Anatomy of leaf	Do not show any special anatomy	Leaves show kranz anatomy
Example	95% of shrubs, trees and plants as wheat, cotton, tobacco, oats etc.	Only 5% of plant on earth are C_4 plants as maize, corn, sugarcane, etc.

162. The first stable product of CO_2 fixation in sorghum is

(a) Phosphoglyceric acid
(b) Pyruvic acid
(c) Oxaloacetic acid
(d) Succinic acid

NEET-2021

@apna_pdf

Ans. (c) : The first stable product of CO_2 fixation in sorghum is **oxaloacetic acid** (4 carbon compound).

- First stable product in C_3-Cycle (calvin cycle) is 3-**phosphoglyceric acid.** PGA is a 3 carbon compound, hence, these plants are called C_3 plants.
- **Pyruvic acid** is the end product of glycolysis and acts as a substrate and a co-factor.
- **Succinic acid** is an intermediate product in krebs cycle or citric acid cycle.

163. Match the following lists:

List-I	List-II
(A) Sun light is essential to the plant process that purifies air fouled by breathing animals	**I. Melvin Calvin**
(B) Bacteria were used to detect the sites of O_2 evolution	**II. Sachs**
(C) Evidence for the production of glucose	**III. Priestley**
(D) Role of air in the growth of green plants	**IV. Ingenhousz**
	V. Engelmann
	VI. Neil

The correct match is:

	A	B	C	D
(a)	IV	I	VI	II
(b)	V	II	IV	III
(c)	IV	II	V	III
(d)	IV	V	II	III

TS EAMCET-10.08.2021 Shift-I

Ans. (d) : Joseph Priestley – Performed a series of experiments that revealed the essential role of air in the growth of green plants.
Julius Von Sachs – Provided evidence for the production of glucose when plants grow.
T.W. Engelmann – The bacteria were used to detect the sites of oxygen (O_2) evolation.
Jan Ingenhousz – Showed that sunlight is essential to the plant process that purifies the air fouled by burning candles or breathing animals.

164. Select the mismatched pair?

(a) F.W. Went – Auxin
(b) Buchner – Zymase
(c) H. G. Khorana – C_4 pathway
(d) Frankel Conrat – RNA

AP EAMCET-03.09.2021 Shift-I

Ans. (c) : C_4 pathway was discovered by M.D. Hatch and C.R. Slack in 1966. So, that this pathway is known as Hatch and slack pathway.
H.G Khorana is associated with genetic research and DNA synthesis. He was also awarded Nobel Prize for his work on the genetic code and the synthesis of oligonucleotides.

165. Which one of the following is NOT an example of C_4 plant?

(a) Sugarcane (b) Gram
(c) Amaranthus (d) Maize

MHT CET 5.10.2020 Shift-I

Ans. (b) : Hatch and Slack gave a new pathway of CO_2 fixation. This take place mostly in monocot plants like sugarcane, Maize and rarely in dicot (Amaranthus). Gram is a C_3 plant.

166. Which of the following statements is incorrect?

(a) RuBisCO action requires ATP and NADPH
(b) RuBisCO is a bifunctional enzyme
(c) In C_4 plants, the site of RuBisCO activity is mesophyll cell.
(d) The substrate molecule for RuBisCO activity is a 5-carbon compound

NEET-2020 Phase-II

Ans. (c) : In C_3 plants, RuBisCO occurs in mesophyll cells, where as in C_4 plants RuBisCO is present in bundle sheath cells. RuBisCO plays a vital role in CO_2 fixation during the calvin cycle.
RuBisCO break down 6-carbon compound into two molecule of 3 carbon compound, and the energy in ATP and NADPH is used to convert molecules into Glyceraldehyde 3 phosphate. The substrate for RuBisCO is ribulose-1,5-biphosphate (5 carbon compound).

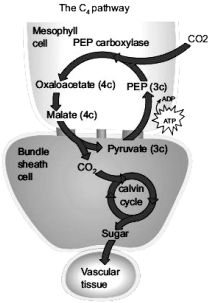
167. In Hatch and Slack pathway, the primary CO_2 acceptor is

(a) Rubisco
(b) Oxaloacetic acid
(c) Phosphoglyceric acid
(d) Phosphoenol pyruvate

NEET (Odisha)-2019

Ans. (d) : The C_4 pathway initiates with a molecule called **phosphoenol pyruvate (PEP),** which is a 3-carbon molecule and acts as the primary CO_2 acceptor in the mesophyll cells of C_4 plants.

- In the Hatch and Slack pathway, phosphoenol pyruvate is the primary CO_2 acceptor and is seen in the mesophyll cells. The carboxylation takes place with the help of an enzyme called **PEP carboxylase**. They yield a 4 – C molecule called **Oxaloacetic acid (OAA)**.



168. Which of the following is not a C_4 plant

(a) Maize (b) Tribulus
(c) Amaranthus (d) Wheat

SRM JEEE-2019

Ans. (d) : C_4 plants- Including maize, sugarcane and sorghum avoid photorespiration by using another enzyme called PEP during the first step of carbon fixation. This step takes place in the mesophyll cells that are located close to the stomata where CO_2 and O_2 enter the plant. Beans, rice, wheat, potatoes, most temperate crops and all woody trees is not a C_4 plant.

169. An example of C4 plant is

(a) Coconut (b) Mango
(c) Rice (d) Sugarcane

SRM JEEE-2019

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Ans. (d) : C4 plant is one that enters the Calvin cycle by converting carbon dioxide into four-carbon sugar molecules. These plants produce a lot of energy and are highly effective in hot, dry environments. Examples of C4 plants include sugarcane, corn, sorghum, millet etc.

170. In the maize plant, CO_2 fixation occurs in both mesophyll and bundle sheath cells. The enzymes involved in these cells for the process respectively are,

(a) RuBisCO and PEP Kinase
(b) PEP Kinase and Pepsin
(c) RuBisCO and PEP Carboxylase
(d) PEP Carboxylase and RuBisCO

Karnataka CET-2018

Ans. (d) : In the Maize plant, CO_2 fixation occurs in both mesophyll and bundle sheath cells. C_4 cycle, PEP carboxylase fixed the carbon dioxide in mesophyll cells, and RuBisCO synthesised the sugars in bundle sheath cells.

171. With reference to factors affecting the rate of photosynthesis, which of the following statements is not correct?

(a) Light saturation for CO_2 fixation occurs at 10% of full sunlight
(b) Increasing atmospheric CO_2 concentration up to 0.05% can enhance CO_2 fixation rate
(c) C_3 plants responds to higher temperatures with enhanced photosynthesis while C_4 plants have much lower temperature optimum
(d) Tomato is a greenhouse crop which can be grown in CO_2 enriched atmosphere for higher yield

NEET-2017

Ans. (c) : At high temperature and light oxygen has a higher affinity for the enzyme RuBisCO. Oxygen bind to RuBisCO instead of carbon dioxide, thus reduces C_3 - plant photosynthetic efficiency and water use efficiency. Thus, in environments with high temperature and light, C_4 plants shows initial carbon fixation in mesophyll cells where PEP, Combines with carbon dioxide to form OAA. Which is further processed significantly improving the plants photosynthetic and water use efficiency. As a result in high light and temperature environments, C_4 plants tend to be more productive than C_3 plants.

172. Study the following lists:

	List-I		List-II
A.	**Hatch and Slack**	**1.**	**Electron microscope**
B.	**Theophrastus**	**2.**	**Citric acid cycle**
C.	**Knoll and Ruska**	**3.**	**Micrographia**
D.	**Robert Hooke**	**4.**	**C_4 pathway**
		5.	**Historia Plantarum**

The correct match is:

	A	B	C	D
(a)	4	5	1	3
(b)	4	5	1	2
(c)	2	4	5	3
(d)	2	3	4	1

AP EAMCET-2005

Ans. (a) :

List-I	List-II
A. Hatch and Slack	1. C_4 pathway
B. Theophrastus	2. Historia Plantarum
C. Knoll and Ruska	3. Electron Microscope
D. Robert Hooke	4. Micrographia

173. If bundle sheath cells of the C_4 plants are infected by an organism, which utilize CO_2 efficiently then which process will be affected very first?

(a) PGAL → RuBP
(b) PGAL+PGA → Glucose
(c) PGA → PGAL
(d) RuBP → PGA

GUJCET-2014

Ans. (d) : The chloroplast and the enzymes needed for the Calvin cycle are found in the bundle sheath cells of C_4 plants. The enzyme RuBisCO combines RuBP (ribulose bisphosphate) with CO_2 to produce PGA (3-Phosphoglycerate), which is the first reaction in the Calvin cycle.

174. How many molecules of ATP and NADPH are require in formation of two molecules of glucose? How many Calvin cycles are required?

(a) 36 ATP, 24 NADPH, 12 Calvin cycles
(b) 18 ATP, 12 NADPH, 6 Calvin cycles
(c) 36 ATP, 24 NADPH, 6 Calvin cycles
(d) 24 ATP, 36 NADPH, 12 Calvin cycles

GUJCET-2015

Ans. (a): Six Calvin cycles are required for the synthesis of one glucose molecule, and these cycles use upto a total of 18 ATP and 12 NADPH.
12 NADPH.
Consequently, 36 ATP, 24 NADPH, and 12 turns of the Calvin cycle are required for the production of 2 glucose molecules.

175. Identify the incorrect statement with respect to Calvin cycle.

(a) The first stable intermediate compound formed is phosphoglycerate.
(b) 18 molecules of ATP are synthesised during carbon fixation.
(c) NADPH + H+ produced in light reaction is used to reduce diphosphoglycerate.
(d) The carboxylation of RuBP is catalysed by RuBisCO.

Karnataka CET-2009

Ans. (b) : Calvin pathway occurs in all photosynthetic plants. Calvin cycles can be described under 3 stages.
(i) Carboxylation
(ii) Reduction
(iii) Regeneration
First stable product of Calvin cycle is 3- phosphoglycer ate.

In	out
6 CO_2	one glucose
18 ATP	18 ADP
12 NADPH	12 NADP.

Hence, no ATP is produced in Calvin cycle.

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176. Chloroplasts without grana are known to occur in

(a) Bundle sheath cells of C_3 plants.
(b) Mesophyll cells C_4 plants.
(c) Bundle sheath cells of C_4 plants.
(d) Mesophyll cells of all plants.

Karnataka CET-2006

Ans. (c) : Chloroplasts without grana are known to occur in bundle sheath cells of C_4 plants. Bundle sheath cells are a layer of cells in plant leaves, and stems, that forms a sheath surrounding vascular bundles. In C_4 plants the bundle sheath cells contains chloroplasts and are sites of Calvin cycles. Sugarcane, maize are example of C_4 plant.

177. A plant in your garden avoids photo respiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological groups would you assign this plant

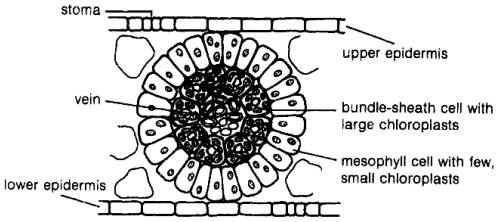
(a) Nitrogen fixer (b) C_3
(c) C_4 (d) CAM

NEET-2016 Phase-I

Ans. (c) : This plant protects your garden photorespiratory losses, improves water use efficiency, shows higher rates of photosynthesis at the high temperatures and has improve nitrogen efficiency of nitrogen utilization is a C_4 plant. Due to the kranz anatomy of its leaves, C_4 plants are unique. They are able to withstand higher temperatures, respond to intense light, lack a wasteful process termed photorespiration, and have better nitrogen consumption efficiency.

The majority of plants with the C_4 pathway have been adapted to dry tropical climates and are referred to as C_4 plants.

eg:- Sugarcane



- **Nitrogen fixation** – It is a biological process in which the nitrogen gas is convert into usable form for plant $\left(NH_3, NO_2^-, NO_3^-\right)$

  eg:- Rhizobium etc.
- **CAM Plant** (Crassulacean acid metabolism) In CAM plant stomata open at night. Which allows CO_2 to diffuse into leaf to be combined with PEP (Phosphoenolpyruvate) & from malate.

  eg:- Opuntia
- **C_3 Plant -** The majority of plant & crop are C3 plants. The first carbon compound produced during photosynthesis contains three carbon atoms [3-phosphogyceric acid (PGA)].

  eg:- Wheat, Oats, Rye.

178. Which of the following characteristics out of I, II and III are exhibited by C_4 plants?

I. Kranz anatomy.
II. The product of photosynthesis is oxalo acetic acid.
III. Both PEP carboxylase and ribulose-bis phosphate carboxylase act as carboxylating enzyme.

Choose the correct option:

(a) I and II, but not III (b) II and III but not I
(c) I and III, but not II (d) All of these

JIPMER-2015

Ans. (d) : C_4 plants have an alternative CO_2 fixation pathway called the Hatch and Slack cycle where OAA is the first stable product. The leaf of these plants has kranz anatomy where the vascular bundles are surrounded by the bundle sheath. Here, two carboxylation reactions take place, first by PEP carboxylase in the mesophyll chloroplast and second by RuBisCO in the bundle sheath chloroplast.

179. If 'X' molecules of ATP are utilised to produce one molecule of glucose during photosynthesis of a C_3-plant and 'Y' molecules of ATP are formed through substrate level phosphorylation during the breakdown of one molecule of glucose in aerobic respiration, then the ratio of 'X' and 'Y' is

(a) 3 : 1 (b) 5 : 2
(c) 1 : 1 (d) 2 : 3

AP EAMCET-2010

Ans. (a) : In the photosynthesis of C_3 plants, one molecule of glucose is produced using 6ATP molecules, and 2ATP molecules is produced during the aerobic respiration process when one molecule of glucose is broken down. Hence the ratio of x and y is 3:1.

180. Which technique has helped in investigation of Calvin cycle?

(a) X-ray crystallography
(b) X-ray technique
(c) Radioactive isotope technique
(d) None of the above

AP EAMCET-2011
AIPMT-1991

Ans. (c): In 1954-55, Calvin traced the pathway of carbon fixation by using radioactive isotope method by using C^{14} and gave the calvin cycle.
Calvin and his co-workers were able to formulate the complete metabolic path of carbon assimilation in the form of cycle which is called as Calvin cycle.

181. C_4 pathway for CO_2 fixation was proposed by

(a) Benson and associates
(b) Arnon and associates
(c) Rouhani and associates
(d) Hatch and associates

UP CPMT-2006

Ans. (d) : Hatch and Slack cycle is the name given to the C_4 cycle, which was originally studied in detail by M.D. Hatch and C.R. Slack in 1966. Oxaloacetic acid is the cycle's first stable carbon product.

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182. The process which makes major difference between C_3 and C_4 plants is
(a) glycolysis (b) calvin cycle
(c) photorespiration (d) respiration

NEET-2016 Phase-II

Ans. (c) : The process which makes major difference between C_3 and C_4 plants is photorespiration.
Photorespiration is the light dependent process of oxygenation of Ribulose Biphosphate and release of carbon dioxide by the photosynthetic organ of a plant. It occurs in chloroplast. The peroxisome and mitochondria are required for completing the process.
• This process creates an important difference between C_3 and C_4 plants as it is absent in C_4 plants.

183. Stomata of CAM plants: -
(a) Are always open
(b) Open during the day and close at night
(c) Open during the night and close during day
(d) Never open

AIPMT-2003

Ans. (c): During the night when temperature lowers down and atmosphere become misty, stomata of CAM plant open and during the day time, when the water stress is high and the rate of transpiration is at its peak the stomata of CAM plants closed.
• Most of the plants stomata open during day time but in CAM open during night time. This type of plants are found in dry environment.

184. In Hatch and Slack pathway
(a) Chloroplast are of same type
(b) Occurs in Kranz anatomy where mesophyll have small chloroplast whereas bundle sheath have granal chloroplast
(c) Occurs in Kranz anatomy when mesophyll have small chloroplast where as bundle sheath have larger, agranal chloroplast
(d) Kranz anatomy where mesophyll cell are diffused

Haryana PMT-2005 / JIPMER-2005
BHU PMT-2003

Ans. (c) : Hatch and Slack pathway occurs in Kranz anatomy where mesophyll have small chloroplasts whereas bundle sheath have larger agranal chloroplast. Kranz anatomy is a specialized structure in C_4 plants where the mesophyll cells are clustered around the bundle-sheath cell in a ring-like fashion.

185. The net requirement of assimilatory power for the formation of 6 hexose molecules in maize plant is
(a) 72 ATP, 48 NADPH
(b) 90 ATP, 60 NADPH
(c) 108 ATP, 72 NADPH
(d) 180 ATP, 72 NADPH

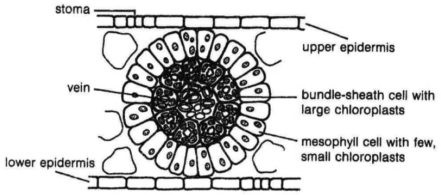
AP EAMCET-2008

Ans. (d) : The net requirement of assimilatory power for the formation of 6 hexose molecules in maize plant is 180 ATP, 72 NADPH.
The C_4 plants respond to higher rate of photosynthesis maize belongs to the group of the C_4 plants. These plants require 30 molecule of ATP and 12 molecule of NADPH for the formation of one molecule of glucose. So, for 6 molecules of glucose to be formed 180 molecules of ATP and 72 molecules of NADPH are required.

186. In Kranz anatomy, the bundle sheath cell have:
(a) Thin walls many intercellular space and large
(b) Thick walls, no intercellular spaces and large number of chloroplasts
(c) Thin walls, no intercellular spaces and several chloroplasts
(d) Thick walls, many intercellular space and few chloroplasts

AIIMS-2015

Ans. (b) : Kranz anatomy is a special type of anatomy found in the leaves of C_4 plants (Sugarcane). Mesophyll cells are clustered around the bundle sheath cells in a ring-like fashion.
The bundle sheath cells with thick walls and no intercellular spaces between them, prevents the entry of O_2 and escape of CO_2. It has a large number of chloroplasts.
It provides a perfect site for CO_2 to be concentrated within the plants, around the RuBisCO.
It helps in preventing photorespiration.



Kranz anatomy

187. The sugarcane plant has
(a) Dumb-bell shaped guard cells
(b) Kpentamerous flowers
(c) Reticulate venation
(d) Capcular fruits.

AIIMS-2004

Ans. (a) : The sugarcane plant has dumb-bell shaped guard cells. It is a characteristic feature of monocot plants.

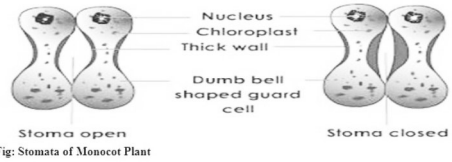


Fig: Stomata of Monocot Plant

188. Which one is a C_4 - plant?
(a) Papaya (b) Pea
(c) Potato (d) Maize/corn

AIPMT-1993

Ans. (d) : A Maize/corn C_4 plant that utilizes the C_4 fixation pathway. This pathway is when the CO_2 is first bound to phosphoenol pyruvate in the mesophyll cell. Example of C_4 plants are sugar cane, maize/corn etc. C_4 plants are well adapted to habitats with high day time temperature, intense sunlight, low water condition.

189. In C_4 plants, Calvin cycle operates in
(a) stroma of bundle sheath chloroplasts
(b) grana of bundle sheath chloroplasts
(c) grana of mesophyll chloroplasts
(d) stroma of mesophyll chloroplasts

AIPMT-1989

Ans. (a) : Unlike the light reactions, which take place in the thylakoid, the reactions of the Calvin cycle take place in the stroma (the inner space of chloroplasts).

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190. C_4 plants can absorb CO_2 from
(a) Its much low concentration
(b) Its much high concentration
(c) Carbonates
(d) Bicarbonates

CMC Vellore-2007

Ans. (a) : The enzyme PEP carboxylase present in C_4 plants is very sensitive to CO_2 that is why C_4 plant can absorb CO_2 even from its much low concentration. An increase in the concentration of CO_2 increase the rate of photosynthesis.

191. C_4-plants show an advantage over C_3-plants when the weather is
(a) dry (b) cold and dry
(c) hot and dry (d) hot and wet

BVP-2013

Ans. (c) : C_4 is a plant commonly found in hot and dry climates.
C_4 plants grow better than C_3 plants under hot, dry condition when plants must close their stomata to conserve water.
- In these plants CO_2 is captured in special mesophyll cells by the first phosphoenol pyruvate to form oxaloacetate.
- The rate of photosynthesis per unit of nitrogen is generally high than that of C_3 plant. C_4 plants are more efficient than C_3 plant due to high rate of photo synthesis and reduced rate of photorespiration.

192. The C_4 plants are different from the C_3 plants with reference to the :
(a) types of pigments involved in photosynthesis
(b) the number of NADPH that are consumed in preparing sugar
(c) types of end product of photosynthesis
(d) the substance that accepts CO_2 in carbon assimilation and first stable product

BCECE-2003

Ans. (d) : The C_4 plant are different from the C_3 plants with reference to the substance that accepts CO_2 in carbon assimilation and first stable product. In C_3 plants the first product is a 3-C compound is 3 phosphoglyceric acid while in C_4 plants, a 4-C compound is oxaloacetic acid a first stable compound.
• The substrate which accepts CO_2 in C_3 plant is a 5-C compound RuBP and in C_4 plant it is PEP, a 3-C compound.

193. Chloroplast dimorphism is a characteristic feature of
(a) plants with Calvin cycle (b) C_4– plants
(c) all plants (d) only in algae

WB JEE-2010

Ans. (b) : Chloroplast dimorphism is a characteristic feature of C_4 plants. Dimorphic chloroplasts are the chloroplasts which are concentrated into two types of cells having different size and structure. The dimorphic chloroplast is present in C_4 plants because of the presence of special leaf anatomy called kranz anatomy.
It is a characteristic feature of C_4 plants, e.g. sugarcane, Amaranthus and maize etc.

194. C_3 – plants have (1) calvin cycle (2) kranz type of anatomy (3) photorespiration (4) No photorespiration
(a) 1,2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2011

Ans. (d) : C_3 plants are defined as the plants that use the C_3 pathway in the dark reaction of photosynthesis. There is no indication of kranz anatomy by the leaves of these plants. The plants that undergo the Calvin cycle for carbon fixation are known as C_3 plants.
* C_3 plants do not have the anatomic structure nor the abundance of PEP carboxylase to avoid photorespiration like C_4 plants.
Hence, C_3 plants have photorespiration. The RuBP binds with O_2 instead of being converted into 2 PGA molecules to form one phosphoglycerate and phosphoglycolate molecule in a pathway called Photorespiration.

195. The loss of water in C_4- plants compared to C_3-plants for the same amount of CO_2 fixed is
(a) half (b) one-third
(c) one-fourth (d) double

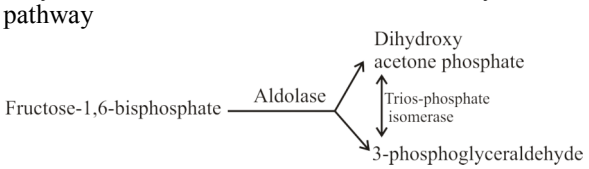
AMU-2010

Ans. (a) : C_4 plants are twice as efficient as C_3 plants in terms of fixing carbon (making sugar). However, a C_4 plants loses only half as much water as a C_3 plants for the same amount of CO_2 fixed. C_4 plant like maize and sorghum loses half as much water as a C_3 plant for the same amount of (CO_2) fixed. The C_4 plants have adapted themselves to continue with the process of photosynthesis even with the stomata closed.

196. Two enzymes common to EMP pathway and C_3 cycle are
(a) Aldolase and triose phosphate isomerase
(b) Aldolase and enolase
(c) Cytochrome oxidase and enolase
(d) Phosphoglyceromutase and triose phosphate isomerase.

AMU-1998

Ans. (a) : Aldolase and triose phosphate isomerase both enzymes are common to EMP & C_3 cycle. EMP pathway



in C_3 cycle
3-phosphoglyceraldehyde $\underset{\text{isomerase}}{\overset{\text{Triose-phosphate}}{\rightleftharpoons}}$ dihydroxyacetone phosphate + 3 phosphoglyceraldehyde $\xrightarrow{\text{Aldolase}}$ fructose-1-6-diphosphate.

197. To form one molecule of glyceraldehydes phosphate in Calvin cycle :
(a) 9ATP and 36 NADPH are required
(b) 6ATP and 6 NADPH are required
(c) 3ATP and 3 NADPH are required
(d) 9 ATP and 6 NADPH are required

Haryana PMT-2005

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Ans. (d) : For fixation of six CO_2 molecules during Calvin cycle of photosynthesis, 18 molecules of ATP and 12 molecules of $NADPH_2$ are required.

- One molecule of glyceraldehyde 3 phosphate is formed by fixation of $3CO_2$ molecules.

For a 3 carbon molecule to be synthesized, 3 turns of the calvin cycle are required, with the entry of a molecule of CO_2 at each turn.

Each turn of Calvin cycle consumes 3 ATP & 2 NADPH molecule So- 3×3 ATP = 9 ATP

3×2 NADPH = 6 NADPH

198. 3-phosphoglyceric acid (PGA) as the first CO_2 fixation product in algal photosynthesis was discovered by

(a) Joseph Priestley (b) Jan Ingenhousz
(c) T.W. Engelmann (d) Julius von Sachs
(e) Melvin Calvin

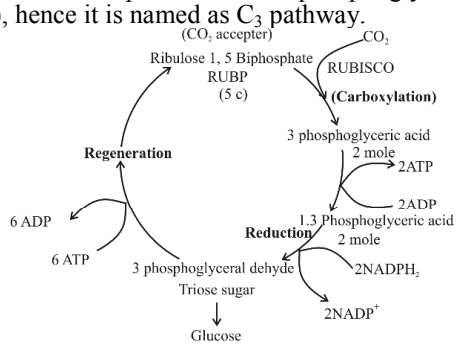
Kerala PMT-2015

Ans. (e) : PGA or 3-phosphoglyceric acid as first CO_2 fixation product in algal photosynthesis was discovered by Melvin Calvin.

He used radioactive ^{14}C in algal photosynthetic studies.

Carbon atoms from CO_2 are fixed and used to make 3-carbon sugars in the calvin cycle. This cycle is powered up, and subject to, ATP and NADPH from the light response, which occur in the thylakoid film. The response of the calvin cycle happen in the stroma (the inner space of chloroplasts).

The first stable product was 3-phosphoglyceric acid (PGA), hence it is named as C_3 pathway.



CALVIN CYCLE

H. Known about ATP and NADPH

199. Three hexoses are produced as net gain in calvin cycle by the assimilatory power generated in noncyclic photophosphorylation with 36 water molecules. The ratio of O_2 released to that of ATP generated is

(a) 3 : 1 (b) 3 : 2
(c) 1 : 1 (d) 4 : 1

TS EAMCET-10.05.2023, Shift-II

Ans. (c) : In noncyclic photophosphorylation, 2 ATP molecules are produced for every water molecule that is split. So, 36 water molecule will produce 72 ATP molecule. For every 2 water molecules that are split, 1 oxygen molecule is produced. So, 36 water molecules will produce 18 oxygen molecules. So, the ratio of O_2 and ATP is 1:1.

200. NADP is converted into $NADPH_2$ in____

(a) Photosystem-II
(b) Calvin cycle
(c) Non-cycle photophosphorylation
(d) Photosystem-I

AP EAMCET-11.07.2022 Shift-II

Ans. (c) : NADP is converted into $NADPH_2$ in non-cyclic photophosphorylation. Non-cyclic photophosphorylation involved both PS-I and PS-II. Flow of electrons is unidirectional. Here electrons are not cycled back and are used the reduction of NADP to $NADPH_2$.

$NADP^+ + 2H + 2e^- \rightarrow NADPH + H^+$

201. How many ATP molecules are generated when one molecule of reduced coenzyme $NADH_2$ is reoxidised during respiratory chain ?

(a) Two (b) Four
(c) One (d) Three

MHT CET-07.10.2020 Shift-I

Ans. (d) : The $NADH_2$ and the $FADH_2$ are produced during the cycles of respiration. These molecules are produced during the glycolysis and the krebs cycle. These molecules are oxidized in the process of electrons transport system (ETS). These products are oxidized and the protons are used for creating a gradient which is used in the synthesis of ATP. $NADH_2$ transfers the electrons to the complex I to complex II. By this process move number of protons which are pumped by ATP synthase. SO, the more protons will result in production of 3 ATPs.

202. Adenosine triphosphate was discovered by

(a) Jack Lipman (b) A Bloor
(c) Karl Lohmann (d) Emil Fisher

JIPMER-2016
Karnataka CET-2004

Ans. (c) : Adenosine Triphosphate (ATP) was discovered by Karl Lohmann in 1929 from the muscles. These are source of energy of the cell produced by the mitochondria.

From the perspective of bio-chemistry, ATP is classified as a nucleoside triphosphate which indicates that it consists of 3 components of nitrogenous base (Adenine), ribose sugar and triphosphate. chemical formula – $C_{10}H_{16}N_5O_{13}P_3$

203. In which one of the following reactions, substrate level phosphorylation does not occur?

(a) 1, 3 bisphosphoglyceric acid → 3-phosphoglyceric acid
(b) Glucose-6-phosphate → Fructose -6-phosphate
(c) Succinyl Co-A→ Succinic acid
(d) Phosphoenol pyruvic acid → Pyruvic acid

AP EAMCET-2005

Ans. (b) : In biological system, this reaction is vital for the cellular storage and transfer of free energy using energy carrier molecules. Phosphorylation is the process of adding a phosphate group of adenosine diphosphate (ADP) to form the adenosine triphosphate (ATP) by the enzyme kinase.

There are total 3 reactions in respiration where substrate level phosphorylation occurs – 2 in glycolysis and one in kreb's cycle.

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In glycolysis-

- Phosphoenol pyruvic acid + AMP + P ~ P → Pyruvic Acid + ATP + H_3PO_4.
- 1, 3–biphosphoglyceric acid + ADP → 3 – phosphoglyceric acid + ATP.
- No phosphate group is added in glucose 5 – phosphate → 3 phosphoglyceric acid.

In kreb's cycle-

- Succinyl – CoA + H_2O + GDP/ADP → Succinate +CoA + GTP/ATP.

Hence, the (b) one is right answer.

204. The 4-carbon compound formed during RuBP regeneration reactions of calvin cycle is:

(a) sedaheptulose phosphate
(b) xylulose phosphate
(c) erythrose phosphate
(d) glyceraldehyde phosphate

AP EAMCET-2000

Ans. (c) : Erythrose phosphate is a four carbon atom sugar produced during the regeneration of RuBP or ribulose 1, 5 bisphosphate from phosphoglyceraldehyde.

Phosphoglyceraldehyde $\xrightarrow{\text{Aldolase}}$ fructose 1,6 diphosphoate $\xrightarrow{\text{Phosphatase}}$ fructose 6 phosphate $\xrightarrow{\text{Trans ketolase}}$ Erythrose 4, phosphate.

205. Process in which the phosphate group of a compound is removed and directly added to ADP is:

(a) substrate level phosphorylation
(b) photophosphorylation
(c) oxidative phosphorylation
(d) none of these

HP CET-2013 / VMMC-2003

Ans. (a) : Substrate level phosphorylation is a reaction in which the phosphate group of a chemical compound is removed & directly added to ADP.

206. In Photosynthesis $NADPH_2$ is formed but in respiration if forms during

(a) HMP (b) ETS
(c) Krebs cycle (d) None of these

BCECE-2008

Ans. (a) : $NADPH_2$ is formed during light reaction of photosynthesis & also formed during hexose monophosphate shunt of glucose oxidation.

The HMP consists of 2 irreversible oxidative reactions and a series of reversible sugar-phosphate conversion. No ATP is consumed or produced directly.

207. How many ATP molecules will be generated in a plant system during complete oxidation of 40 moles of glucose?

(a) 190 (b) 380 (c) 1520 (d) 3040

WB JEE-2012

Ans. (c) : During the complete oxidation of one molecule of glucose, 38 ATP molecules are produced. So, 40 molecules of glucose will produced.

$40 \times 38 = 1520$ ATP molecules.

208. How many ATP molecules are obtained from fermentation of 1 molecule of glucose?

(a) 2 (b) 4 (c) 3 (d) 5

WB JEE-2009 / J&K CET-2011

Ans. (a) : During alcoholic fermentation of glucose molecule, it is oxidized to pyruvic acid by glycolysis. The pyruvic acid is decarboxylated to form acetaldehyde and CO_2. The acetaldehyde is then reduced to ethanol. The process of glycolysis results in the net production of 2 molecules of ATP.

Fermentation is a biochemical process that gets energy from carbohydrates and does not require oxygen.

$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 2ATP$ (energy)

209. The number of NADPH molecules that are used during the conversion of carbon dioxide into one molecules of glucose

(a) 4 (b) 1
(c) 12 (d) 6

VMMC-2013

Ans. (c) : Formation of 1 molecule of glucose requires 6 turns of calvin cycle. It is called C_3 cycle because the first stable compound formed a 3-carbon molecule PGA

In	Out
Six CO_2	One glucose
18 ATP	18 ADP
12 NADPH	12 NADP

210. Energy equivalent of a NADH in which of the following numbers of ATP molecules?

(a) 2 (b) 3
(c) 38 (d) 36

J&K CET-2012 / AFMC-2004 / Karnataka CET-2000

Ans. (b) : Each NADH molecule the oretically yield 3 ATP molecules during chemiosmosis. In some tissues, NADH requires more energy to cross the mitochondrial membrane & some of its potential is lost.

NADH(Nicotinamide adenine dinucleotide) is a coenzyme central to metabolism. It consist of two nucleotide joined through their phosphate group.

211. The role of the oxidative pentose phosphate pathway is to generate reducing potential in the form of

(a) NADPH only (b) NADH only
(c) FADH only (d) FADH and NADH

AMU-1998

Ans. (a) : The role of the oxidative pentose phosphate pathway is to generate reducing potential in the form of NADPH only**.** Pentose phosphate pathway is an oxidative phosphate pathway of cellular respiration in which glucose 6 phosphate acts as the substrate. After its complete oxidation through HMP, 12 $NADPH^+$, H^+ & $6CO_2$ are formed. Pentose phosphate pathway also known as hexose monosphosphate shunt (HMP).

In this pathway, no ATP is directly produced from oxidation of glucose-6-phosphate.

212. Chemiosmotic theory of ATP synthesis, in the chloroplast and mitochondria, is based on:

(a) proton gradient
(b) membrane potential
(c) accumulation of K ions
(d) accumulation of Na ions

WB JEE-2006 / Kerala PMT-2013

Ans. (a) : Chemiosmotic theory of ATP synthesis, in the chloroplast and mitochondria, is based on proton gradient. The chemiosmotic theory explains how ATP is generated in the mitochondria via the ETC. ETC is an oxidative phosphorylation reaction taking place in the inner membrane of the mitochondria. ATP is generated utilizing the electronchemical gradient generated due to the accumulation of protons in the thylakoid lumen of chloroplast.

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I. Photorespiration

213. Photorespiration is favoured by
(a) high temperature and low O_2
(b) high humidity and temperature
(c) high O_2 and low CO_2
(d) high CO_2 and low O_2

JIPMER-2003 / AIPMT-1996
Rajasthan PMT-1999,2004,2006
AIPMT-1996 / Punjab MET-2006

Ans. (c) : Photorespiration is favored by high oxygen and low CO_2 conditions. Photorespiration is light induced oxidation of photosynthetic intermediates with the help of oxygen.
Due to this condition, RuBisCO behaves as carboxylase and it enters the calvin or C_3 cycle. It occurs when the CO_2 level inside a leaf become low or high O_2 concentration, high intensity and high temp.

214. The substrate for photorespiration is
(a) phosphoglyceric acid (b) glycolate
(c) serine (d) glycine

Uttarakhand-2005 / MGIMS Wardha-2003
JIPMER-1997 / AIPMT-1989

Ans. (b) : The substrate of photorespiration is a 2-carbon compound glycolic acid (glycolate). The atomospheric O_2 react with RuBP and form phosphoglycolate and phosphoglycerate. Phosphoglycerate converted into glycolate which is act as substrate for photorespiration.

215. The compounds produced when RuBP reacts with O_2 are
(a) 3 - phosphoglyceric acid.
(b) G-3-P and DHAP
(c) Phosphoglycerate and Phosphoglycolate
(d) Phosphoglycolate and Glyceraldehyde - 3.P

AP EAPCET-23.05.2023, Shift-II

Ans. (c) :
- [(RuBP reacts with oxygen (O_2) instead of carbon dioxide (CO_2) during the process of photosynthesis, a phenomenon called photorespiration occurs.)]
- Then it forms a six-carbon compound called 2-carboxy-3-keto-arabinitol 1,5-bisphosphate. This compound is unstable and quickly breaks down into three-carbon compounds-phosphoglycerate and phosphoglycolate.
- Phosphoglycerate is a precursor to the calvin cycle, which is the main pathway for photosynthesis.
- Phosphoglycolate is a wasteful product that is reduced back into the calvin cycle.

216. Assertion (A) :Photorespiration is a wasteful process
Reason (R) : There is no synthesis of sugars, ATP or NADPH, instead ATP is utilized and CO_2 is released in photorespiration
(a) Both A and R are correct R is the correct explanation of A
(b) Both A and R are correct, but R is not the correct explanation of A
(c) A is correct but R is incorrect
(d) A is incorrect but R is correct

AP EAPCET-23.05.2023, Shift-I

Ans. (a) : Photorespiration is a process that occurs in plant when oxygen is present in high concentration. It is a wasteful process because it does not produce any sugars or ATP, and it actually consumes ATP. The wasteful nature of photorespiration has been puzzle to scientists for long time. While the exact reason is not confirmed but some hypothesis suggest that photorespiration help as a protective mechanism, preventing damage caused by excess oxygen in certain conditions. Another idea suggest that it regulate the temperature of plant.

217. Choose the correct statements.
(A) Photorespiration is synthesis or neither sugar nor ATP rather release of O_2
(B) CAM metabolism is an alternative to C_3 and C_4 pathways of CO_2 fixation in plants in dry and hot climates
(C) Bundle sheath cells are having large number of chloroplasts, thick walls with no intercellular space
(D) After World War II photosynthetic studies were exemplary
(a) A, B, C (b) B, C, D
(c) A, C, D (d) A, B, D

TS EAMCET-09.08.2021 Shift-II

Ans. (b) : Photorespiratoin is a wasteful pathway that occurs when RuBisCO acts on O_2 rather than CO_2 and does not produce ATP or NADPH.
C_4 plants are adapted to dry hot tropical region. In C_4 plants photorespiration does not occur so C_4 pathways is more efficient than the C_3 pathway. In the leaves of C_4 plants, special type of anatomy is present in which bundle sheath cells are having large number of chloroplasts, thick wall with no inter cellular space, called kranz anatomy.

218. Three major ways in which different cells handle pyruvic acid are as follows, except —
(a) Lactic acid fermentation
(b) Photorespiration
(c) Aerobic respiration
(d) Alcoholic fermentation

AP EAMCET-03.09.2021 Shift-I

Ans. (b) : There are 3 major ways in which different cells handle pyruvic acid produced by glycolysis, there are, anaerobic respiration including lactic acid fermentation, alcoholic fermentation & aerobic respiration.

Lactic acid fermentation-

$$\text{Pyruvic acid} + NADH \rightarrow \text{Lactic acid} + NAD^+$$

Aerobic respiration (in glycolysis)

$$\text{Glucose} \rightarrow \text{Pyruvic acid} + 2ATP$$

Alcoholic fermentation-

$$C_6H_{12}O_6 \rightarrow 2\,C_2H_5OH + 2CO_2$$

$$\text{Glucose} \rightarrow 2\ \text{pyruvate} \rightarrow 2\ \text{acetaldehyde} \rightarrow 2\text{ethanol}$$

Photorespiration-

$$\underset{5C}{\text{Ribulose 1,5-biphosphate}} + O_2 \xrightarrow[\text{oxygenase}]{\text{RuBP}} \underset{3C}{\text{PGA}} + \underset{2C}{\text{Phosphoglycolate}}$$

219. Photorespiration RuBisCO binds with O_2 to form
(i) Phosphoglycerate
(ii) Phosphoglycolate
(iii) Glyceraldehyde-3-Phosphate

@apna_pdf

(iv) Phosphoenol pyruvate

The correct combination is :

(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iv)

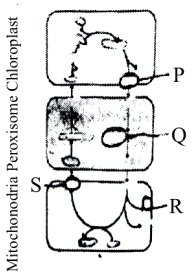
TS EAMCET-02.05.2018 Shift-II

Ans. (a) : RuBisCO can bind to either carbondioxide or oxygen depending on environmental condition. Binding to carbondioxide and initiation of the calvinc cycles is favoured at low temperatures and at a high carbon dioxide-to-oxygen ratio in RuBisCO, an oxygen molecule can bind comfortable in the site designed to bind to carbon dioxide.

The RuBP binds with O_2 to form one molecule of PGA (3c compound) and phosphoglycolate (2c compound) in the pathway of photorespiration.

$$\underset{5C}{\text{Ribulose 1,5-biphosphate}} + O_2 \xrightarrow[\text{oxygenase}]{\text{RuBP}} \underset{3C}{\text{PGA}} + \underset{2C}{\text{Phosphoglycolate}}$$

220. In the given figure, what are the substances labelled as P, Q, R and S?



(a) P-PGA, Q-Glyoxylate, R-NH_3, S-Serine
(b) P-Glycolate, Q-Glyoxylate, R- NH_3, S-Serine
(c) P-Glycolate, Q-Glycerate, R- CO_2, S-Serine
(d) P-RuBP, Q-Glycerate, R-CO_2, S-Serine

GUJCET-2017

Ans. (b): In the given diagram, it represents C_2 cycle or photorespiration. The process has following steps:-

- Oxygen bind with RuBP oxygenase and forms phosphoglycolate in chlroplast which gets converted to glycolate and is transported to peroxisome.
- In peroxisomes it forms glyoxylate and then glycine. Glycine then enters the mitochondria, and looses NH_4 and CO_2 and forms serine.
- The photo respiratory cycle with glycolate – glyoxylate CO_2 – serine are involved in this photorespiratory cycle.
- Photorospiration occurs in chloroplast, peroxisome and mitochondria. It is wasteful process there is no formation of any product.

221. Photorespiration is also known as -------- pathway

(a) C_2 (b) C_3
(c) C_4 (d) Carbon reduction

SRM JEEE -2017

Ans. (a) : Photorespiration (also known as the oxidative photosynthetic carbon cycle or C_2 cycle) refers to a process in plant metabolism where the enzyme RuBisCO oxygenates RuBP wasting some of the energy produced by photosynthesis. C_3 cycle is also known as calvin cycle. C_4 cycle is also known as Hatch and slack cycle. Carbon reduction cycle is known as C_3 cycle.

222. Which of the option is correct for photorespiration?

(a) In Chloroplast, glycerate forms glycine
(b) In Peroxisome, glycerate forms phosphoglycolate
(c) In Mitochondrion, glycine forms serine
(d) In Bundle sheath, serine forms glycine

GUJCET-2014

Ans. (c) : The phosphoglycolate which is formed in the chloroplast is transferred to the peroxisome in the form of glycolate. The glycolate in peroxisome is converted to glycine through some intermediates and then transferred to the mitochondria. In the mitochondria 2 molecules of glycine form a molecule of serine, CO_2 and NH_3 and serine is transferred to peroxisome.

In chloroplast→

Glycerate→ 3 phosphoglycerate +2 phosphoglycolate.

In peroxisome → Glycolate oxidase → H_2O_2+ glyoxalate →Glycine.

223. The correct sequence of cell organelles during photorespiration is:

(a) Chloroplast-mitochondria-peroxisome
(b) Chloroplast-vacuole-peroxisome
(c) Chloroplast-Golgibodies-mitochondria
(d) Chloroplast-Rough endoplasmic reticulum-Dictyosomes

AIPMT (Screening)-2012

Ans. (a) : The correct sequence of cell organelles during photorespiration is-

Chloroplast → Mitochondria → Peroxisome.

Photorespiration is a process which takes place in C_3 plants. It is a wasteful pathway in which ATP produced by photosynthesis is used in oxygenation reaction. It is occurs in C_3- plant not C_4 plant. Photorespiration occurs when O_2 does bind to RuBisCO hence CO_2 fixation is decreases.

224. One set of a plant was grown at 12 hours day and 12 hours night period cycles and it flowered while in the other set night phase was interrupted by flash of light and it did not produce flower. Under which one of the following categories will you place this plant ?

(a) Darkness neutral (b) Day neutral
(c) Short day (d) Long day

JCECE-2009 / AIPMT-2004

Ans. (c) : Plants basically reply to their surroundings in another way primarily based on special intervals of the day and temperature or so they normally concepts. When the dark period is interrupted by the flash of light, the plant could not produce flowers because the dark period could not reach the critical requirement. It shows that the plant needs a long dark period than the light period. So it is a short day plant.

- Short day plant flowers only when day length is less than about 12 hours.

225. During oxidative phosphorylation, the net gain of ATP is

(a) 40 (b) 38
(c) 34 (d) 30

CMC Ludhiana-2012

Ans. (c) : 34 molecule of ATP are obtained as a result of oxidative phosphorylation (30 through NADH and 4 through $FADH_2$) .

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Glycolysis yields 6 ATP, 6 ATP from link reaction and from krebs cycle 22 ATP are generated through oxidative phosphorylation.

Source	Carbon flow	Number of NADH or $FADH_2$	Number of ATP molecules by substrate level phosphorylation	Net ATP molecules made by oxidative phosphorylation	Maximum yield of ATP
Glycolysis	Glucose (6C)→ 2 Pyruvate	2 NADH	2 ATP	6 or 4 ATP from 2 NADH	8 or 6
Pyruvate decarboxylation	2 Pyruvate (3C) → 2 acetyl (2C)+ 2 CO_2	2 NADH		6 ATP from 2 NADH	6
Krebs cycle	2 acetyl (2C)→ 4 CO_2	6 NADH 2 $FADH_2$	2 ATP	18 ATP from 6 NADH and 4 ATP from 2 $FADH_2$	24
Total	Glucose (6C)→ 6 CO_2	10 NADH 2 $FADH_2$	4 ATP	34 ATP	36 or 38 ATP

226. The first reaction in photorespiration

(a) phosphorylation (b) decarboxylation
(c) oxygenation (d) carboxylation

VMMC-2002 / UP CPMT-2001 / AP EAMCET-1998

Ans. (c) : Photorespiration is the uptake of O_2 instead of CO_2 in presence of light by green plants. The first reaction in photorespiration is oxygenation. In this step, RuBP is converted into one molecule of 3 PGA and one molecule of 2 phasphoglycolate. This reaction is catalysed by enzyme RuBisCO.

$$\underset{5C}{\text{Ribulose 1,5-biphosphate}} + O_2 \xrightarrow[\text{oxygenase}]{\text{RuBP}} \underset{3C}{\text{PGA}} + \underset{2C}{\text{Phosphoglycolate}}$$

J. FactorAffecting Photosynthesis

227. Match the following

List–I (Cycle/fixation name)		List–II (Product formed)	
A.	**First stable product of TCA cycle**	**i.**	**Ammonia**
B.	**First stable product of C_3 cycle**	**ii.**	**3 PGA**
C.	**First stable product of C_4 cycle**	**iii.**	**OAA**
D.	**Product of nitrogen fixation**	**iv.**	**Citric acid**

(a) A – ii, B – iii, C – I, D - iv
(b) A – iii, B – ii, C – iv, D - i
(c) A – iv, B – ii, C – iii, D - i
(d) A – I, B – iv, C – ii, D - iii

TS EAMCET-11.05.2023, Shift-I

Ans. (c) :

A.	First stable product of TCA cycle	iv.	Citric acid
B.	First stable product of C_3 cycle	ii.	3 PGA
C.	First stable product of C_4 cycle	iii.	OAA (Oxalo Acetic Acid)
D.	Product of nitrogen fixation	i.	Ammonia

- TCA cycle-also known as the kreb's cycle is a series of chemical reaction that produce energy for the cell. The first stable product of the TCA cycle is citric acid.
- C_3 cycle also called as calvin cycle is the process that plants use sunlight to convert CO_2 into glucose. The first stable product of the C_3 cycle is phosphoglycerate.
- C_4 cycle is a variation of the C_3 cycle that is used by some plants to more efficiently fix CO_2. The first stable product of the C_4 cycle is OAA.
- Nitrogen fixation is the process by which nitrogen gas is converted into Ammonia. Ammonia is a form of nitrogen that can be used by plants and other organisms.

228. The saturation point of CO_2 in C_4 plants is:

(a) 390 µl/L (b) 450 µl/L
(c) 460 µl/L (d) 360 µl/L

AIIMS-27.05.2018 Shift-I

Ans. (d) : At high temperatures C_4 plants are more efficient. This is because their saturation point is low compared to C_3 plants. C_4 plants have higher optimum temperature for photosynthesis than C_3 plants due to the carbon-dioxide concentrating system. Plants take sunlight in the morning and carbon dioxide at night and make their food at that particular time. The optimum carbon dioxide concentration or saturation point is low compared to C_3 plants in C_4 plants. It is 360 µl/L.
C_3 response to increased CO_2 concentration and saturation is only beyond 450 µl/L.
460 µl/L is atmospheric saturation of CO_2 is around 0.39%

229. Photosynthesis cannot continue for long if during light reaction, only cyclic-photophosphorylation takes place. This is because

(a) There is unidirectional cyclic movement of the electrons
(b) There is no evolution of O_2
(c) Only ATP is formed $NADPH^+ + H^+$ is not formed
(d) Photosystem I stops getting excited of a wavelength of light beyond 680 nm

Karnataka CET-2008

Ans. (c) : Assimilatory power (ATP and $NADPH_2$) are produced during light reaction of photosynthesis. As only cyclic photophosphorylation takes place, only ATP is formed because NADP reductase enzyme is absent in the storma lamellae, so in the cyclic photophosphorylation NADPH & O_2 does not forms. And photosynthesis cannot continue for long. In the absence of $NADPH_2$, the dark reaction of photosynthesis does not takes place.

230. Plants adapted to low light intensity have :

(a) Higher rate of CO_2 fixation than the sun plants
(b) More extended root system
(c) Leaves modified to spines
(d) Larger photosynthetic unit size than the sun plants

Manipal-2007/AIPMT-2004/MGIMS Wardha-2015

Ans. (d) : At lower light levels, chloroplasts have larger proteinaceous photosynthetic unit (PSU) to increase the probability that a photon will strike the chlorophyll antenna. So, plants adapted to low light intensity don't have larger photosynthetic unit size than the sun plants. Shade tolerant plants have lower photosynthetic rates and hence, lower growth rate.
Plants adopted to low light intensity have a higher rate of CO_2 fixation than the sun plants.

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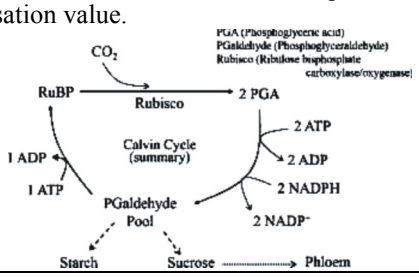
231. Photosynthesis in C_4 plant is relatively less limited by atmospheric CO_2 levels because

(a) there is effective pumping of CO_2 into bundle sheath cells
(b) RuBisCO in C_4 plants has higher affinity for CO_2
(c) six carbon acids are the primary initial CO_2 fixation products
(d) the primary fixation of CO_2 is mediated via PEP carboxylase.

AIIMS-2016

Ans. (d) : Plants such as sugarcane and sorghum fix atmospheric CO_2 in phosphoenol pyruvic acid to produce of oxaloacetic acid (C_4) in the presence of phosphoenol pyruvate corboxylase (PEP corboxylase). These plants are called C_4 plants.

- In C_4 plants the primary product of OAA is mediated by PEP carboxylase, so it is relatively less limited by atmospheric CO_2 levels because C_4 plants have low compensation value.



232. Which of the following set of elements are essential for the photosynthesis to occurs

(a) Cu, Co, Fe (b) Cu, Mo, Zn
(c) Mg, Co, Mn (d) Mg, Fe, Mn, Cu, Cl, P

AIIMS-2014

Ans. (d) : Magnesium (Mg)- It is a constituent of the ring structure of chlorophyll.

Iron (Fe)- It involved in the transfer of electrons like ferredoxin and cytochromes. It is reversibly oxidized from Fe^{2+} to Fe^{3+} during electron transfer.

Manganese (Mn)- The main function of Mn is in splitting of water to liberate O_2 during photosynthesis.

Copper (Cu)- It is essential for the overall metabolism in plants.

Chlorine (Cl)- It is essential for the water splitting reaction in photosynthesis a reaction that leads to O_2 evolution.

Phosphorus (P)- It is required for all phosporylation reactions.

233. At a temperature above 35ºC

(a) rate of photosynthesis will decline earlier than that of respiration
(b) rate of respiration will decline earlier than that of photosynthesis
(c) there is no fixed pattern
(d) both decline simultaneously

AIPMT-1992

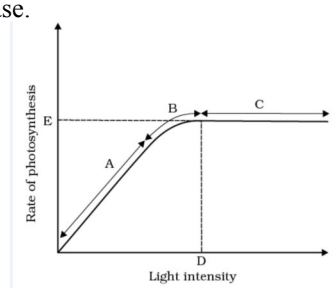
Ans. (a) : If the temperature is increased to more than 35°C there will be a decline in the rate of photosynthesis due to the denaturation of carbon fixing enzymes. The temperature optimum for photosynthesis of different plants also depends on the habitat that they are adapted to.

234. During monsoon, the rice crop of eastern states of India shows lesser yield due to limiting factor of

(a) CO_2 (b) light
(c) temperature (d) water

AIPMT-1991

Ans. (b) : During monsoon, the rice crop of the eastern states of India shows lesser yield due to limiting factor of light. Light quality, light intensity and duration of exposure to light act as factor that affect photosynthesis. During monsoon, the cloudy day condition reduce the light intensity for the plant due to which photosynthetic yield decrease.



235. What will happen if the supply of oxygen is decreased to an illuminated wheat plant?

(a) Its photosynthesis would decrease
(b) Its respiration process would stop
(c) All physiological process would stop
(d) Its photosynthesis would increase

AMU-2003

Ans. (d) : Wheat is a C_3 plant, where the rate of photosynthesis increases when the amount of oxygen decreases. C_3 carbon fixation is one of the metabolic pathway. This process converts CO_2 & RuBP into 3 phosphoglycerate.

236. Stomata of CAM plants

(a) Open during the night and close during the day
(b) Never open
(c) Are always open
(d) Open during the day and close at night

MGIMS Wardha-2010

Ans. (a) : CAM plants open their stomata at night decreasing water loss & increasing water use efficiency as well as drought tolerance.

237. A decrease in photosynthetic rate with increased availability of oxygen is called:

(a) Warburg effect-
(b) Richmond Lang effect
(c) Blackmans law of limiting factors
(d) Emerson enhancement effect

Karnataka CET-2003

Ans. (a) : An increase in O_2 concentration result in decrease in photosynthetic rate is effect is called Warburg effect.

238. If oxygen content is reduced to 1% the rate to respiration becomes

(a) optimum (b) minimum
(c) maximum (d) None of these

CG PMT-2007

Ans. (b) : If the rate of respiration is higher or directly depends on the concentration of available oxygen. Increase in O_2 concentration increases the rate of respiration.

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14 RESPIRATION IN PLANTS

A. Plants Breathing and Cellular Respiration

1. Match the following :

List–I (Compound oxidized)		List–II (Compound formed)	
A.	Succinic acid	I.	Acetyl COA
B.	α- keto glutaric acid	II.	Succinyl COA
C.	Iso citric acid	III.	Oxalosuccinic acid
D.	Pyruvic acid	IV.	Fumaric acid

(a) A – I, B – III, C – IV, D - II
(b) A – I, B – II, C – III, D - IV
(c) A – III, B – II, C – I, D - IV
(d) A – IV, B – II, C – III, D - I

TS EAMCET-11.05.2023, Shift-I

Ans. (d) : D one is the correct combination–

A.	Succinic acid	IV.	Fumaric acid
B.	α-keto glutaric acid	II.	Succinyl COA
C.	Iso citric acid	III.	Oxalosuccinic acid
D.	Pyruvic acid	I.	Acetyl COA

2. The ascending order of molecules of the following compounds released during the oxidation of two molecules of pyretic acid $FADH_2$, CO_2, $NADH_2$

(a) 1, 3, 4 (b) 2, 6, 8
(c) 1, 6, 8 (d) 2, 4, 6

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : During the oxidation of two molecules of pyruvic acid, 2 molecules of $FADH_2$, 6 molecules of CO_2 and 8 molecules of $NADH_2$ are released .

- The ascending order of molecules of the following compounds released during the oxidation of two molecules of pyruvic acid is–
- 2 molecules of $FADH_2$
- 6 molecules of CO_2
- 8 molecules of $NADH_2$

3. Assertion (A) : The pathway from glucose to lactic acid occur in 10 metabolic steps. Organisms will trap this energy and store in the form of chemical molecules.
Reason (R) : Glucose is the only substrate for the production of energy.
The correct option among the following is:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)
(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)
(c) (A)is true but (R) is false
(d) (A) is false but (R) is true

TS EAMCET-10.08.2021 Shift-I

Ans. (c) : The pathway from Glucose to lactic acid occur in 10 metabolic step. Glycolysis is the metabolic pathway that converts glucose ($C_6H_{12}O_6$) into pyruvic acid, (CH_3CO COOH). The free energy released in this process is used to form the high-energy molecules ATP and reduced NAD, Glucose is the not only substrate for the production of energy. Protein and fat are also able for the production of energy.

4. Match the location of the cell given in Column I with its function in Column II.

Column I	Column II
1. Mitochondrial matrix	p. Kreb's cycle
2. Cytoplasm	q. ETC
3. F_0 and F_1	r. Glycolysis
4. Inner mitochondrial membrane	s. ATP synthesis

(a) 1 - p, 2 - r, 3 - s, 4 - q
(b) 1 - q, 2 - s, 3 - q, 4 - r
(c) 1 - r, 2 - q, 3 - p, 4 - s
(d) 1 - s, 2 - p, 3 - r, 4 - q

Karnataka CET-2021

Ans. (a) : Krebs's cycle occurs in matrix of mitochondria as it enzymes are present in matrix except succinic dehydrogenase, which is found attached to inner mitochondrial membrane.

- Glycolysis occurs in the cytoplasm and involves partial oxidation of glucose into two molecules of pyruvic acid through a series of enzyme mediated reactions.
- $F_0 - F_1$ particles an oxysomes are spherical or knob like structures present in the inner membrane of the mitochondria. F_1 head piece contains the site for ATP synthesis from ADP and phosphate. F_o forms the channel through which protons across the inner membrane.
- Electron transport chain (ETC) occurs in the inner mitochondrial membrame.

5. Choose the correct statements regarding entry of substrates into respiratory pathway.

(A) The amino acids will be formed by protease activity on proteins.
(B) Carbohydrates will be converted into glucose for entry.
(C) Amino acids will enter as pyruvate or acetyl COA.
(D) Fatty acids will be entered as PGAL.
Options:

(a) B, C only (b) A, C only
(c) C, D only (d) B, D only

TS EAMCET-28.09.2020 Shift-I

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Ans. (a) : The correct statement about entry of substrates into respiratory pathway are

Respiratory substrates	Converted into a substrate to enter in respiration	Respiratory pathway in which they enter
Carbohydrates like source fructose	Glucose	Glycolysis
Fatty acids (from fats)	Acetyl CoA	Krebs cycle
Glycerol (from fats)	Phosphoglyce-raldehyde	Glycolysis
Amino acids (from proteins)	Acetyl CoA, Pyurvic acid	Krebs cycle

6. Match the following:

a.	**Pyruvic acid**	**i.**	**End products in respiration**
b.	**Acetyle Co-A**	**ii.**	**End products in an aerobic respiration**
c.	**$C_2H_5OH + H_2O$**	**iii.**	**Connecting link between glycolysis and Krebs**
d.	**$CO_2+H_2O+ATP+\Delta$**	**iv.**	**End product in Glycolysis**

(a) (a – ii), (b – i), (c – iii), (d – iv)
(b) (a – i), (b – ii), (c – iii), (d – iv)
(c) (a – iv), (b – iii), (c – ii), (d – i)
(d) (a – iv), (b – iii), (c – i), (d – ii)

AP EAMCET-24.09.2020 Shift-I

Ans. (c) : Pyruvic acid – End product in Glycolysis
Acetyl CoA – Connecting link between glycolysis and krebs
$C_2H_5OH+H_2O$ – End products in an aerobic respiration.
$CO_2 + H_2O + ATP + \Delta$ - End products in respiration

7. Which of the following statements regarding mitochondria is incorrect?
(a) Enzymes of electron transport are embedded in outer membrane.
(b) Inner membrane is convoluted with infoldings.
(c) Mitochondrial matrix contains single circular DNA molecule and ribosomes.
(d) Outer membrane is permeable to monomers of carbohydrates, fats and proteins.

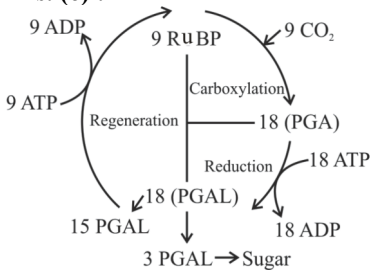
NEET-2019

Ans. (a) : The enzymes of the electron transfer chain are embedded in the inner membrane of the mitochondria.
The inner membrane is convoluted with infolding to increase its surface area. The outer membrane is permeable to monomers of carbohydrates, fats, and proteins for transport into the mitochondria through protein channels called porins.

8. If 18 PGAL are formed during dark reaction, how many Calvin cycles and ATPs are required respectively?
(a) 9 Calvin cycle, 24 ATP
(b) 8 Calvin cycle, 18 ATP
(c) 9 Calvin cycle, 27 ATP
(d) 6 Calvin cycle, 36 ATP

GUJCET-2018

Ans. (c) :



In a Calvin cycle (Dark Reaction) –
for 1 CO_2 molecule →2 PGAL + 3 ATP required
2 PGAL formed in 1 Calvin cycle
18 PGAL formed in $\frac{18}{2} = 9$ Calvin cycle
In 1 Calvin cycle → 3 ATP form
So, in 9 Calvin cycle 3 × 9 = 27 ATP form
Thus, 9 Calvin cycle, and 27 ATP are required for formation of 18 PGAL during dark reaction.

9. The number of ATP molecules produced during aerobic and anaerobic respiration are……and …… respectively.
(a) 2 and 38 (b) 0 and 2
(c) 38 and 0 (d) 38 and 2

HP CET-2018

Ans. (d) : The number of ATP molecules produced during aerobic and anaerobic respiration are 38 and 2 respectively.

10. Which one of the following is true about respiration in green plants? Respiration takes place____.
(a) Only when stomata are open
(b) Only when photosynthesis stops
(c) Only when photosynthesis is in progress
(d) Throughout life

MHT CET-2018

Ans. (d) : Plants breathe throughout its life span both during the day and night. However it is prominent at night.

11. The overall goal of glycolysis, Krebs cycle and the electron transport system is the formation of:-
(a) Nucleic acids
(b) ATP in small stepwise units
(c) ATP in one large oxidation reaction
(d) Sugars

AIPMT-2007

Ans. (b) : Respiration is an energy liberating, enzymatically controlled multistep catabolic reaction. In this process step wise break down of organic substances (hexose sugar) takes place inside the living cell.
3 major process occur in aerobic respiration- glycolysis, kreb's cycle and electron transport chain.
The substrate is completely broken down to form CO_2 and water and a large amount of energy is released stepwise in the form of ATP.
Hence, the overall goal of glycolysis, Krebs cycle and the electron transport system is the formation of ATP in small stepwise units.

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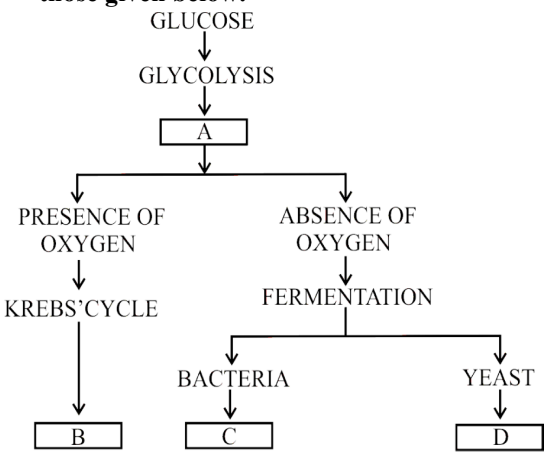
12. The following is a simplified scheme showing the fate of glucose during aerobic and anaerobic respiration. Identify the end products that are formed at stages indicated as A, B, C and D. Identify the correct option from those given below.



(a) A = Carbondioxide and water,
B = Pyruvic acid,
C = Ethyl alcohol and Carbondioxide,
D = Lactic acid,

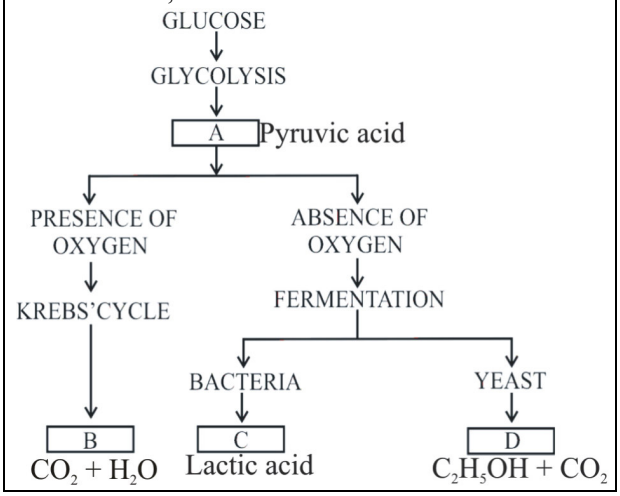
(b) A = Pyruvic acid,
B = Carbondioxide and water,
C = Lactic acid,
D = Ethyl alcohol and Carbondioxide,

(c) A = Pyruvic acid,
B = Carbon dioxide and water,
C = Ethyl alcohol and Carbon dioxide,
D = Lactic acid,

(d) A = Pyruvic acid,
B = Ethyl alcohol and Carbondioxide,
C = Lactic acid,
D = Carbondioxide and water,

Karnataka CET-2006

Ans. (b) : A = Pyruvic acid, B = Carbon dioxide and water, C = Lactic acid, D = Ethyl alcohol and Carbondioxide,



13. Match the following column I and II for organismic respiration.

column-I		column-II	
A.	Respiration in bacteria	1.	Mitochondria
B.	Respiration in cyanobacteria	2.	Cytoplasmic membrane
C.	Respiration in eukaryotic cell	3.	Mesosomes

Codes:

	A	B	C
(a)	2	3	1
(b)	3	2	1
(c)	1	3	2
(d)	3	1	2

JIPMER-2015

Ans. (b) : Respiration in bacteria → Mesosomes
In bacteria plasma membrane folds to form a cell organelles called mesosome which is similar to mitochondria in function.

Respiration in Cyanobacteria → Cytoplasmic membrane
Respiration in cyanobacteria occurs with the help of cytoplasmic membrane which is made of lipid and protein.

Respiration in eukaryotic cell → Mitochondria
In eukaryotic cell mitochondria (power house of cell) perform the process of respiration.

14. Oxidation of palmitic acid yield :

(a) 129 ATP (b) 132 ATP
(c) 36 ATP (d) 76 ATP

AIPMT-1998

Ans. (a) : Palmitic acid = $C_{16}H_{32}O_2$
$2n = 16$
$n = 8$
that means after the oxidation of palmitic acid 8 Acetyl CoA form,
Number of NADH & $FADH_2$ form = n – 1
= 8 – 1
= 7
Hence there will be 7NADH & 7$FADH_2$ form,
1 NADH = 3 ATP
7 NADH = 7 × 3 = 21 ATP
1 $FADH_2$ = 2 ATP
7 $FADH_2$ = 7 × 2 = 14 ATP
In TCA cycle, 1 Acetyl CoA produce = 12 ATP
So, in TCA cycle, 8 Acetyl CoA form = 12 × 8 = 96 ATP.
From NADH = 21 ATP
From $FADH_2$ = 14 ATP
From TCA cycle = 96 ATP
131 ATP
During the process of oxidation ,
In the first step 2 ATP molecule utilized,
Remaining ATP molecule = 131 – 2 = 129 ATP.
Thus, through the oxidation of one molecule of palmitic acid number of ATP molecule release = 129 ATP

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15. Which of the following respiratory substrate requires the highest number of O_2 molecules for its complete oxidation?

(a) Tripalmitin (b) Triolein
(c) Tartaric acid (d) Oleic acid

AP EAMCET-2009

Ans. (b) : Triolein – Triolein is a respiratory substrates which requires highest number of ATP molecule for its complete oxidation. It is a symmetrical triglyceride which is derived from 3 units of unsaturated fattyacid chain linked with a molecule of glycerol.

- **Tripalmitin–**Triglycerides such as tripalmitin, trilaurin, tricaprin and trimyristin are used for constructing the internal lipid core.
- **Tartaric acid–**Tartaric acid is often used as an acidulant in grape and lime-flavored beverages, gelatin desserts, jams, jellies , and hard sour confectionary.
- **Oleic acid –** Oleic acid is a type of fatty acid. Oils with oleic acid are used to replace saturated fats in the diet.

16. Four respiratory enzymes are given below. Arrange them in increasing order of the carbon number of the substrates on which they act

(i) Enolase
(ii) Aconitase
(iii) Fumarase
(iv) Alcohol dehydrogenase
The correct order is:

(a) (ii), (iv), (iii), (i) (b) (iv), (i), (ii), (iii)
(c) (i), (iv), (iii), (ii) (d) (iv), (i), (iii), (ii)

AP EAMCET-2009

Ans. (d) :

Respiratory Enzyme	Substrate	Number of Carbon in substrate
Enolase	2 phosphoglyceric acid	3 C
Aconitase	Citric acid	6 C
Fumarase	Fumaric acid	4 C
Alcohol dehydrogenase	Acetaldehyde	2 C

Thus, increasing order of enzyme based on the carbon number of the substrates on which they act is
(iv), (i), (iii), (ii).

17. Step of respiration are controlled by:

(a) Substrates (b) Enzymes
(c) Hormone (d) Bile juice

UPCPMT-2002

Ans. (b) : Step of respiration are controlled by enzymes. In the process of cellular respiration, Glucose is converted into CO_2 & H_2O
This process takes place in 3 steps -
(i) Glycolysis
(ii) Citric acid cycle
(iii) Oxidative phosphorylation

Enzymes–Enzyme transfers the electron from one molecule to another during the respiration.

Ex–In glycolysis (EMP pathway) dehydrogenase removes the hydrogen ion and electrons from intermediate of cell cycle & passed to NAD forming NADH.

Hormone – Hormones are chemical substances that act like messenger molecule in the body.

Bile Juice – Bile is a fluid that is made and released by the liver and stored in the gallbladder. Bile helps indigestion. It breaks down fat into fatty acid.

Substrate – In a context of enzymes, a substrate is the molecule that an enzyme act upon to speed up a reaction.

18. Net gain of ATP in prokaryotes from a molecule of glucose when oxidized is:

(a) 40 (b) 38
(c) 36 (d) 34

UP CPMT-2002

Ans. (b) : In prokaryotes when a single molecule of glucose is oxidized, total 38 molecules of ATP are obtained.

- 2 ATP molecules obtained from glycolysis.
- 2 ATP molecules obtained from kreb's cycle.
- 34 ATP molecules obtained from electron transport system.

Thus, 38 ATP molecules are obtained by oxidation of single glucose molecule.

19. Salt respiration is:

(a) secretion of salt through respiratory channels
(b) decrease in respiration during salt absorption
(c) active increase in respiration during mineral absorption
(d) linking of ion movement with respiratory chain

J&K CET-2002

Ans. (c) : Salt Respiration :- It is the increase in the rate of respiration of a plant or tissue when it is transferred from water to a salt solution.
Saline water contains Na^+ & Cl^- ions. These ions move from lower concentration to higher concentration (against the concentration gradient). In this way salt respiration requires more energy. Hence, Salt respiration is active increase in respiration during mineral absorption.

20. Through which process, phospho-glyceraldehyde is converted into biphosphoglyceric acid?

(a) Phosphorylation and oxidation.
(b) Dephosphorylation and dehydrogenation.
(c) Carboxylation and hydration.
(d) Decarboxylation and hydrogenation.

GUJCET-2008

Ans. (a) : Phosphorylation and oxidation cellular respiration is the process of obtaining chemical energy from the breakdown of organic molecules that we consume through food.
The C-C bonds in the complex molecule undergo oxidation that breaks the bond between them and release lots of energy which the cell traps in the form of ATPs (phosphorylation). Hence, through Phosphorylation and oxidation process, phospho-glyceraldehyde is converted into biphosphoglyceric acid.

21. Cristae help in:

(a) respiration (b) photosynthesis
(c) transpiration (d) guttation

BHU PMT (Mains)-2010

@apna_pdf

Ans. (a) : Mitochondria is a double membrane bound cell organelles.
(i) outer membrane
(ii) inner membrane
The inner membrane folds inside and increase the surface area by forming finger like projection called cristae, which help in respiration. Cristae have 2 faces
(i) Towards matrix side – N face
(ii) Cytosolic side – P face
ATP synthases is an enzyme complex found in inner membrane of mitochondria.

22. Consider the following statements with respect to respiration.
a. Glycolysis occurs in the cytoplasm of the cell
b. Aerobic respiration takes place within the mitochondria
c. Electron transport system present in the outer mitochondrial membrane
d. $C_{51}H_{98}O_6$ is the chemical formula of Tripalmitin – a fatty acid
e. Respiratory quotient

$$= \frac{\text{Volume of } O_2 \text{ evolved}}{\text{Volume of } CO_2 \text{consumed}}$$

Of the above statements
(a) a, b and d alone are correct
(b) b, c and d alone are correct
(c) c, d and e alone are correct
(d) b, d and e alone are correct
(e) a, c and e alone are correct

Kerala PMT-2012

Ans. (a) : Electron transport system is present in the inner membrane of mitochondria.
• The electron transport chain is a series of complexes made up of proteins and organic molecules in the inner membrane of the mitochondria. The electron are transported from NADH + H^+ and $FADH_2$ to molecular oxygen through the complexes of the ETC.
• Tripalmitin ($C_{51}H_{98}O_6$) - is triglyceride derived from palmitic acid, a common fatty acid.
• Respiratory quotient (R. Q) – R.Q is the ratio of volume of carbon dioxide liberated in respiration to the volume of oxygen consumed in it over specific period of time by a unit tissue, called organ or organisms.

$$R.Q = \frac{\text{Volume of } CO_2 \text{ liberated}}{\text{Volume of } O_2 \text{consumed}}$$

23. When malic acid is the respiratory substrate
(a) the amount of carbon dioxide released is more than the oxygen consumed
(b) the amount of carbon dioxide released is less than the oxygen consumed
(c) the amount of carbon dioxide released is equal to oxygen consumed
(d) carbon dioxide is not released

Uttarakhand PMT-2010

Ans. (a) : When malic acid is respiratory substrate: Then the value of R.Q is more than 1 (more than unit.)

$$\underset{\text{Malic acid}}{2C_4H_6O_5} + 3O_2 \longrightarrow 4CO_2 + 3H_2O$$

$$\therefore R.Q = \frac{4}{3} = 1.33 \ (> 1)$$

Hence, the amount of carbon dioxide released is 1.33 times more than the oxygen consumed when malic acid is a respiratory substrate.

24. Pick the reactions separately from the following where a water molecule is removed and reduction of NAD^+ does not occur in the reactions of respiration
(I) Succinic acid → Fumaric acid
(II) Malic acid → Oxaloacetic acid
(III) 2 phosphoglycerate → Phasphoenol pyruvic acid
(IV) Pyruvic acid → Acetyl Co-A
Correct answer is:
(a) I, IV (b) I, II
(c) II, III (d) I, III

AP EAMCET-2016

Ans. (d) :
Succinic acid → Fumaric acid
FAD → $FADH_2$
In Krebs cycle when succinic acid converts to fumaric acid, reduction of FAD occur instead of NAD^+.
2Phosphoglycerate → Phosphoenol pyruvic acid + $2H_2O$
In the process of glycolysis when phosphoglycerate converts to phosphoenol pyruvic acid, 2 water molecules are released.

25. Select the wrong statement :
(a) When tripalmitin is used as a substrate in respiration, the R.Q. is 0.7
(b) The intermediate compound which links glycolysis with Kreb's cycle is malic acid
(c) One glucose molecule yields a net gain of 36 ATP molecules during aerobic respiration
(d) One glucose molecule yield a net gain of 2 ATP molecules during fermentation
(e) The scheme of glycolysis was given by Embden, Meyerhof and Parnas

Kerala PMT-2011

Ans. (b) : Pyruvic acid formed during glycolysis undergoes oxidative decarboxylation to form acetyl CoA. This 2-carbon acetyl CoA acts as a conneting link between glycolysis and kreb cycle.
• Acetyl CoA acts as substrate enters in krebs cycle and the acceptor molecule is oxaloacetate a four carbon compound.
Hence, the intermediate compound which links glycolysis with Kreb's cycle is malic acid is incorrect statement.

26. Cyanide resistant respiration is characteristic of:
(a) viruses (b) bacteria
(c) plants (d) animals

CG PMT-2011 / BHU PMT(Mains)-2006
DUMET-2002

@apna_pdf

Ans. (c) : Cyanide resistant respiration is characteristic of plants.

- During aerobic respiration is the flow of electron in usual mitochondrial electron transport chain is blocked by the presence of cyanides which inhibit the activity of cytochrome oxidize. This type of activity is known as cyanide sensitive respiration.
- Plant mitochondria, however, differ from the animal mitochondria in having an alternate oxidize system pathway through which terminal oxidation of reduced coenzyme continues even in the presence of cyanides. This type of respiration is known as cyanide resistant (or cyanide insensitive) respiration.

27. Which of the following two enzymes catalyzes the release of CO_2 from the substrate?

(I) ∝- Ketoglutaric dehydrogenase
(II) Pyruvate dehydrogenase
(II) Succinic thiokinase
(IV) Enolase

(a) (I), (IV) (b) (II), (III)
(c) (I), (II) (d) (III), (IV)

TS EAMCET-15.05.2016

Ans. (c) : In Krebs cycle, α- ketoglutarate (5C) undergoes oxidative decarboxylation to form succinyl CoA (4c). The reaction is catalyzed by α - ketoglutarate dehydrogenase enzyme complex. One molecule of CO_2 is released and NAD^+ is converted to NADH.

- Pyruvate dehydrogenase enzyme complex converts pyruvic acid into acetyl CoA. This reaction is an oxidative decarboxylation reaction in which one molecules of CO_2 is released and one molecule of reduced NADH is formed.

$2Pyruvate + 2NAD^+ + 2CoA \xrightarrow[Mg^{2+}]{\text{Pyruvate dehydrogenase}} 2acetyl\ CoA + NADH + H^+ + CO_2$

28. Complete oxidation of a molecule of glucose yield :

(a) 15 ATP molecules (b) 36 ATP molecules
(c) 2 ATP molecules (d) 8 ATP molecules

BVP-2006

Ans. (b) : Glycolysis is a sequence of 10 chain reactions catalyzed enzymes. 38 molecules of ATP are formed in oxidation of 1 mol of glucose in aerobic conditions but 2 molecules of ATP are used in during glycolysis , so the net gain is of 36 molecules of ATP. The free energy released in this process in used to produce the high energy molecules ATP and NADPH.

B. Know about Glycolysis

29. Which of the following connect glycolysis to Krebs cycle?

(a) Acetyl Co-A
(b) Ribozyme
(c) Cytochrome oxidase
(d) N-acetyl glucosamine

HP CET-2011 / CMC Vellore-2010
CG PMT-2009, 2007 / Uttarakhand PMT-2007
BCECE-2007, 2006 / UP CPMT-2003, 2001
Rajasthan PMT-1996

Ans. (a) : Acetyl Co-A connect glycolysis to krebs cycle. During glycolysis pyruvic acid is formed by partial oxidation of glucose in the cytoplasm. Pyruvic acid gets transported to the mitochondria, where it undergoes oxidative decarboxylation to form acetyl Co-A. The Acetyl Co-A enters in the kreb cycle.

30. Match List I with List II :

	List I		List II
A.	Oxidative decarboxylation	I.	Citrate synthase
B.	Glycolysis	II.	Pyravate dehydrogenase
C.	Oxidative phosphorylation	III.	Electron transport system
D.	Tricarboxylie acid cycle	IV.	EMP pathway

Choose the correct answer from the options given below :

(a) A-II, B-IV, C-III, D-I
(b) A-III, B-IV, C-II, D-I
(c) A-II, B-IV, C-I, D-III
(d) A-III, B-I, C-II, D-IV

NEET (UG) 07.05.2023

Ans. (a) : Glycolysis is a metabolic pathway in which glucose converts into pyruvic acid.
glycolysis is also called as EMP pathway.(Embden, Meyerhof. and Paranus.)

- Oxidative phosphorylation is an oxidation response where the carboxyl molecule is eliminated as CO_2
- TCA cycle is also known as Krebs cycle or citric cycle it begin with the formation of citric and which contains three carboxylic group (COOH).

31. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : ATP is used at two steps in glycolysis.

Reason R : First ATP is used in converting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1-6-diphosphate.

In the light of the above statements, choose the correct answer from the options given below :

(a) A is false but R is true.
(b) Both A and R are true and R is the Correct explanation of A.
(c) Both A and R are true but R is NOT the correct explanation of A.
(d) A is true but R is false.

NEET (UG) 07.05.2023

Ans. (b) : Glycolysis is the process in which glucose is broken down to produce energy. It produce, two molecule of pyruvic acid, ATP, NADH and water.

- Glycolysis operate in the cytoplasm of cell and does not require oxygen. It occur in both aerobic and anaerobic organisms.
- In first step and third step ATP is used.
- The end products of the reaction include 2 pyruvate 2 ATP and 2 NADH molecules.

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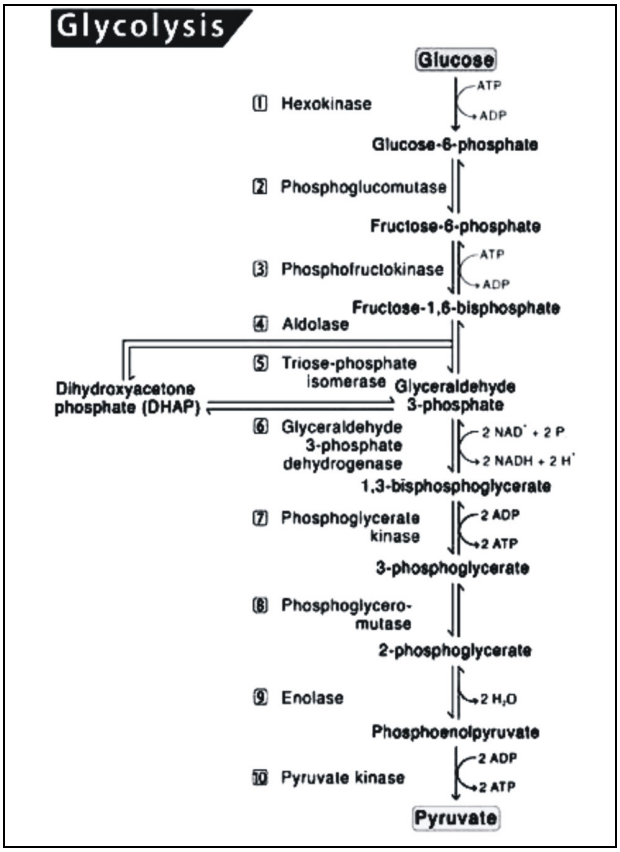


32. What is the ratio of total ATP molecules formed to net ATP molecules in oxidation of a glucose molecule through glycolytic pathway?

(a) 2:1 (b) 1:2
(c) 3:1 (d) 1:3

TS EAMCET-31.07.2022 Shift-I

Ans. (a) : In glycolysis, two molecules of ATP are consumed during double phosphorylation of glucose to form fructose- 1, 6 diphosphate, while four molecules of ATP are formed by substrate level phosphorylation. Hence, there is a net gain of 2 ATP.

$$\text{Ratio} = \frac{4\ \text{ATP}(\text{proceed during glycolysis})}{2\ \text{ATP}(\text{net gain ATP})}$$

Ratio = 2 : 1

33. Identify the biomolecule common to respiration involving fat, carbohydrate and protein.

(a) Pyruvic acid
(b) Glucose-6-phosphate
(c) Citric acid
(d) Acetyl CoA

TS EAMCET-09.08.2021 Shift-I

Ans. (d) : Acetyl CoA is common intermediated for all the biomolecules to be broken down in the respiratory pathway. Carbohydrates are first converted into glucose. Glucose is converted to pyruvate, which is then decarboxylated to acetyl CoA to enter the TCA cycle.
Fats are broken down into fatty acids and glycerol. Fatty acids are converted into acetyl CoA. Proteins are broken down into amino acids, which are then deaminated and enter as Krebs cycle intermediates, pyruvate or acetyl CoA.

34. Total how many ATP molecules are formed by substrate level phosphorylation in glycolysis?

(a) 8 ATP (b) 4 ATP
(c) 36 ATP (d) 2 ATP

MHT CET-08.10.2020 Shift-I

Ans. (b) : In the substrate level phosporylation per 1 glucose of molecule in glycolysis there are 4 ATP generated. Keep in mind that 2 ATP were used at the begining of pathway.

35. If mitochondria is absent in mature RBC what will be the source of energy:

(a) TCA (b) ETS
(c) Link reaction (d) Glycolysis

AIIMS-25.05.2019 Shift-II

Ans. (d) : In the blood, 3 types of blood corpuscles are found-RBC, WBC, Platelets
In mature mammalian RBC mitochondria absent so kreb cycle does not function.
Through the process of glycolysis RBC metabolize glucose which produces lactate, which is then released from cell provide 2 ATP from each glucose molecules.

36. From among the following, identify the substrate required for the only oxidative reaction that occurs in the process of glycolysis

(a) 3–phosphoglyceric acid
(b) Glyceraldehyde 3–phosphate
(c) Fructose–6–phosphate
(d) Glucose–6–phosphate

TS EAMCET-02/05/2018 Shift-II
AP EAMCET-2007

Ans. (b) : In glycolysis, the oxidative reaction refers to the conversion of glyceraldehyde–3–phosphate to 1,3–bisphosphoglycerate. This is the step where NAD^+ is reduced to form NADH, which is an important electron carrier.
The correct substrate for this oxidative reaction is Glyceraldehyde 3–phosphate.

37. Which is correct link reaction

(a) Pyruvic acid + NAD^+ + Co-A $\xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}}$ Acetyl Co-A + $NADH.H^+ + CO_2$

(b) Pyruvic acid + FAD^+ + Co-A $\xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}}$ Acetyl Co-A + $NADPH.H^+ + CO^2$

(c) Pyruvic acid + NAD^+ + Co-A $\xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}}$ Acetyl Co-A $NADPH.H^+ + CO_2$

(d) Pyruvic acid + NAD^+ + Co-A $\xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}}$ Acetyl Co-A + $NADH.H^+$

AIIMS-27.05.2018 Shift-II

Ans. (a) : The process of glycolysis takes places in cytosol. It is a catabolic process. The end product of this process is pyruvate. Pyruvate enters in mitochondrial matrix that undergoes oxidative decarboxylation by a complex set of reactions catalyzed by pyruvic dehydrogenase.

@apna_pdf

The reactions catalyzed by pyruvic dehydrogenase need the participation of several coenzymes, including NAD^+ and coenzyme A.

$$\text{Pyruvic adic} + NAD^+ + \text{Co - A} \xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}} \text{Acetyl Co - A} + NADH.H^+ + CO_2$$

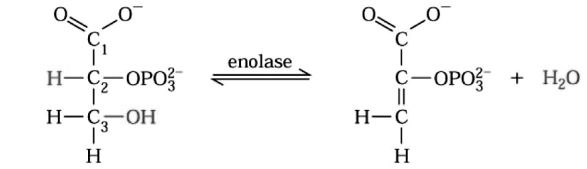
The acetyl Co-A formed in the above reaction enters the krebs cycle.

38. In which of the following reactions of glycolysis, a molecule of water is removed from the substrate?

(a) Glucose → Glucose-6-phosphate
(b) Fructose-6-phosphate → Fructose-1,6 bisphosphate
(c) 2-phosphoglycerate → Phosphoenol pyruvate
(d) Phosphoenol pyruvate → pyruvate

AIIMS-2017

Ans. (c) : In the 9th step of glycolysis, enolase enzyme catalyzes the conversion of 2-phosphoglycerate into phosphoenolpyruvate. This enzyme removes water from 2- Phosphoglycerate and results in the production of phosphoenolpyruvate.



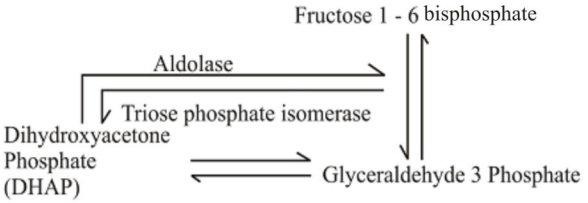
2-Phosphoglycerate (2PG) **Phosphoenolpyruvate (PEP)**

39. During glycolysis the compounds PGAL and DHAP are formed from fructose 1, 6 diphosphate by____

(a) Cleavage (b) Isomerisation
(c) Phosphorylation (d) Condensation

MHT CET-2017

Ans. (a) : This is a type of cleavage reaction, which means breaking a larger molecule into smaller molecules.



Fructose 1, 6 bisphosphate undergoes cleavage to provide glyceraldehydes 3- phosphate (PGAL) and dihydroxyacetone phosphate (DHAP) in a reversible reaction catalyzed by fructose, 1,6-biphosphate aldolase.

40. Number of oxygen molecules utilized in glycolysis is____

(a) 0 (b) 2
(c) 4 (d) 6

MHT CET-2017

Ans. (a) : In the process of respiration (both aerobic and anaerobic), glycolysis is a common process. In the anaerobic respiration there is no need of single molecule of oxygen. It takes places in cytoplasm of cell.

41. The outcome of Calvin cycle include:

(a) 6 CO_2, 18 ATP, 12 NADPH
(b) One glucose, 18 ATP, 12 NADPH
(c) 6 CO_2, 18 ADP, 12 NADP
(d) One glucose, 18 ADP, 12 NADP

Karnataka CET-2017

Ans. (d) : Calvin cycle perform a very important role in the process of photosynthesis.
It is also known as light independent reaction or biosynthetic phase or dark reaction etc.
Calvin cycle occurs in 3 stages –
Carboxylation, reduction, regeneration
One CO_2 molecule fixes in one round of calvin cycle.
The outcome of calvin cycle include 1 molecule of Glucose, 18 ADP & 12 NADP.

42. Excess CO_2 suppress cell growth and productivity by?

(a) Inhibiting respiration
(b) Changing osmolarity of medium
(c) Altering PH of the medium
(d) Both a and c

SRM JEEE -2017

Ans. (d) : Excess CO_2 suppress cell growth and productivity by-
(1) Altering intracellular p^H by diffusing across cell membrane and,
(2) Inhibiting respiration etc.

43. Common enzyme in glycolysis and pentose phosphate pathway is

(a) hexokinase (b) aconitase
(c) fumarase (d) dehydrogenase

UP CPMT-2011

Ans. (d): The enzyme which is found in glycolysis and Pentose phosphate pathway is known as Dehydrogenase.

In pentose phosphate pathway –

Glucose 6 Phosphate —(Dehydrogenation (at Ist Carbon))→ NADPH
NADPH —(Oxidative Phosphorylation)→ Production of ATP

In Glycolysis –

Glyceraldehyde 3 Phosphate —(Glyceraldehyde 3-Phosphate dehydrogenase)→ 1,3- bisphosphoglycerate

44. Identify the correct combinations of the following

	Substrate	Enzyme	Product
I.	Phosphoenol pyruvate	PEP Carboxylase	C_4 acid
II.	Malate	Malic enzyme	C_4 acid
III.	RuBP	Ribulose 5-phosphate kinase	C_3 acid
IV.	Pyruvate	Pyruvate dikinase	C_3 acid

@apna_pdf

The correct combination is:

(a) III and IV (b) I and II
(c) II and III (d) I and IV

AP EAMCET-2007

Ans. (d) : I and IV

	Substrate	Enzyme	Product
I.	Phosphoenol pyruvate	PEP Carboxylase	C_4 acid
II.	Malate	Malate Dehydrogenase	C_4 acid
III.	RuBP	RuBisCo	C_3 acid
IV.	Pyruvate	Pyruvate dikinase	C_3 acid

- PEP Carboxylase-phosphoenolpyruvate carboxylase
- RuBisCo- Ribulose - 1,5 -bisphosphate corboxylase / oxygenase.

Note-

- Malate dehydrogenase is an enzyme that reversibly catalyzes the oxidation of malate to oxaloacetate using the reduction of NAD^+ to NADH.

45. Net gain of ATP during glycolysis are:

(a) 2 (b) 4
(c) 8 (d) 10

GUJCET-2008 / Haryana PMT-2007 / UP CPMT-2006

Ans. (c): Net gain of ATP during glycolysis is 8

In aerobic & anaerobic both respiration, Glycolysis is the first stage of breakdown of glucose in the cell.

In the process of glycolysis, number of ATP molecules used = 2 ATP

Number of ATP molecules generated in glycolysis = 4 ATP.

In the process of glycolysis 2 NADH also form = $2 \times 3 = 6$ ATP

Total ATP molcecule produced = 6 + 4 = 10 ATP

2 ATP molecule utilized earlier

Remaining ATP molecule = 10 – 2 = 8 ATP

46. Which of the following is concerned with CO_2 fixation ?

(a) Krebs cycle (b) Calvin cycle
(c) Ornithine cycle (d) Glycolysis

UP CPMT-2003

Ans. (b) : The calvin cycle is process that happens in plants, algae and some bacteria. It takes CO_2 from the air and fixed it into sugars like glucose. This process occurs in three stages : Carbon fixation, reduction and regeneration of starting molecules.

47. Oxidation of pyruvate to CO_2 and H_2O occur through

(a) citric acid cycle (b) tricarboxylic acid
(c) Krebs cycle (d) All of these

AMU-2008

Ans. (d) : Oxidation of pyruvate to CO_2 and H_2O occurs through the citric acid cycle, which is also known as the tricarboxylic acid cycle or the kreb's cycle. These are different names for the same series of reactions that break down acetyl-CoA derived from carbohydrates, fats and proteins into carbon dioxide, water and energy. The citric acid cycle produces two molecules of CO_2, one molecules of ATP, three molecules of NADH, and are molecule of $FADH_2$ for each molecule of acetyl-CoA that enters the cycle.

48. Glycolysis term has originated from Greek words:

(a) glycose and lysis (b) glycos and lysis
(c) glyco and lysis (d) glucose and lysis

AMU-2012

Ans. (b) : The term glycolysis originates from Greek words Glycos for sugar & lysis for splitting. Glycolysis occurs in both aerobic & anaerobic respiration.

49. Which of the following is formed from phosphorylation?

(a) Fructose 1, 6-bisphosphate
(b) Phosphoglyceric acid
(c) PEP
(d) Pyruvic acid

JCECE-2015

Ans. (a) : Fructose 1,6-bisphosphate is further phosphorylated by means of ATP in the presence of enzyme phosphofructokinase and Mg^{2+}, the product is fructose 1,6-diphosphate or bisphosphate. So the correct answer is fructose 1, 6-biphosphate.

50. Which of the following enzymes is responsible for formation of glucose from glucose-6-phosphate ?

(a) Kinase (b) Aldolase
(c) Dehydrogenase (d) Phosphatase

BHU-PMT (Screening)-2008

Ans. (a) : Glucose is phosphorylated to glucose 6-Phosphate by ATP (Adenosine tri Phosphate) in the presence of enzyme thiokinase or glucokinase and magnesium ($Mg2^+$),

51. Which group of the following scientists discovered the EMP pathway of glycolysis:

(a) Embden, Meyerhof and Parnas
(b) Emerson, Hoffman and Peterson
(c) Embden, Morrison and Pitcher
(d) Avery, Mcleon and McCarthy

BVP-2002

Ans. (a) : Glycolysis is also known as the Embden - Meyerhof - Parnas (EMP) pathway, which was discovered by - Gustav Embden, Otto Meyerhof and J. Parnas in 1930. Glycolysis is a metabolic pathway that is oxygen-independent.

52. In glycolysis, during oxidation electrons are removed by -

(a) Glyceraldehyde-3-phosphate
(b) NAD^+
(c) Molecular oxygen
(d) ATP

AIPMT-2004

Ans. (b) : During glycolysis, NAD (nicotinamide adenine dinucleotide) removes electrons from 1,3 diphospho-glyceric acid using diphosphoglyceral dehyde dehydrogenase

- NAD^+ changes to NADH and this is either utilized as such in anaerobic respiration or in the presence of oxygen.
- NAD^+ is coenzyme central to metabolism found in all living cell. NAD^+ is called a dinucleotide because it consists of two nucleotide.
- Some NAD^+ is converted into the coenzyme nicotinamide adenine dinucleotide phosphate.

@apna_pdf

53. Which one of the following reactions is an example of oxidative decarboxylation?
(a) Conversion of succinate to fumerate.
(b) Conversion of fumerate to malate.
(c) Conversion of pyruvate to acetyl CoA.
(d) Conversion of citrate to isocitrate.

Karnataka CET-2011

Ans. (c) : The pyruvic acid formed during glycolysis enters the mitochondria where oxidative decarboxylation takes place and acetyl CoA– is formed from pyruvate.
This reaction is catalysed by the pyruvic acid dehydrogenase complex and occurs in the presence of NAD^+ and coenzyme - A

Pyruvic acid + NAD^+ + Co-A $\xrightarrow[Mg^{++}]{\text{Pyruvate dehydrogenase}}$ Acetyl Co-A + $NADH + H^+ + CO_2$

54. $2NADH(H^+)$ produced during anaerobic glycolysis yield:
(a) 6 ATP molecules (b) 4 ATP molecules
(c) 8 ATP molecules (d) none of the above

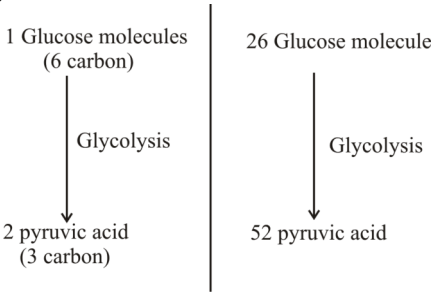
Punjab MET-2007

Ans. (d) : Anaerobic respiration on fermentation is a metabolic process that converts sugar to acid and gases or alcohol. This process takes place when the electron transport chain is unavailable due to lack of a final electron receptor. As the electron transport chain is inactive, NADH (H^+) cannot donate their electron to the ETC to generate ATP. Instead the NADH(H^+) are used in the oxidation of pyruvate formed during anaerobic glycolysis into ethanol and CO_2.
Therefore, as NADH(H^+) is not involved in generation of ATP during anaerobic respiration.

55. How many glucose molecules are required for the formation of 52 pyruvic acid molecules at the end of glycolysis?
(a) 52 (b) 46
(c) 32 (d) 26

MHT CET-2016

Ans. (d) :



56. Which process does the following equation represent?
$C_6H_{12}O_6 + 2NAD + 2ADP + 2Pi \rightarrow 2CH_3–CO–COOH + 2NADH_2 + 2ATP$
(a) Complete glycolysis
(b) Complete aerobic respiration
(c) Complete anaerobic respiration
(d) Complete fermentation

MHT CET-2015

Ans. (a) : Glycolysis is the process in which glucose is split to form energy. It produces two molecules of pyruvate, ATP, NADH and water. The process takes place into the cytoplasm and it does not require oxygen.
$C_6H_{12}O_6 + 2NAD + 2ADP + 2Pi \rightarrow 2CH_3COCOOH + 2NADH_2 + 2ATP$

57. Acetylation of Pyruvate takes place in the____
(a) Perimitochondrial space
(b) Mitochondrial matrix
(c) Cristae
(d) F_1 particles

MHT CET-2014

Ans. (a) : In the process of respiration between glycolysis and kreb cycle linker step is conversion of pyruvate to acetyl Co-A. When pyruvate enter in mitochondria, acetylation starts to take place in perimitochondrial space (space between inner and outer mitochondrial space), before the pyruvate enters the mitochondrial matrix for further processing in the citric acid cycle.

58. Which is the first compound which is common for both glucose & fructose in glycolysis?
(a) Fructose-6-phosphate
(b) Glucose-6-phosphate
(c) Fructose-1, 6-bisphosphate
(d) Fructose-1-phosphate

BCECE-2015

Ans. (a) : Glycolysis is the first process in the process of respiration. It is a multistep reaction. Glucose and fructose both are functional isomers & undergo glycolysis when they required.
Fructose 6-Phosphate is found common to both glucose and fructose in glycolysis.

59. Which enzyme fixes CO_2 in Calvin cycle ?
(a) RuBP carboxylase (b) PEP carboxylase
(c) Carbonic anhydrase (d) Hexokinase

A Punjab MET-2011

Ans. (a) : The enzyme that fixes CO_2 in the Calvin cycle is called Rubisco or RuBP carboxylase. It catalyzes the incorporation of CO_2 into a molecule called RuBP, initiating the process of carbon fixation in photosynthesis.

C. The Fermentation

60. Anaerobic respiration after glycolysis is called:
(a) restoration (b) fermentation
(c) multiplication (d) fragmentation

BCECE-2010 / MGIMS Wardha-2008
Uttarakhand PMT-2007 / WB JEE-2006

Ans. (b) : Aerobic and anaerobic both respiration includes the process of glycolysis.
In anaerobic respiration the generation of 2 ATP occur in the process of glycolysis. Anaerobic process after the glycolysis is called as fermentation.

61. The end product of fermentation are:
(a) CO_2 and O_2 (b) CO_2 and C_2H_5OH
(c) O_2 and C_2H_5OH (d) CO_2 and CH_3CHO

BVP-2012 / VMMC-2002
Haryana-2000, 2001 / AIPMT-1997

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Ans. (b) : The end product of fermentation are C_2H_5OH & CO_2. The chemical equation for alcoholic fermentation is $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$.
It is anaerobic process (There is no supply of O_2).
There are two types of fermentation & their end products are different.

Fermentation	End product
Lactic acid fermentation	lactate
Alcohol fermentation	ethyl alcohol and CO_2.

62. Idenitfy the correct statement about fermentation.
(a) Glucose breakdown completely
(b) Net gain of energy is 2 ATP and 1 $NADH_2$
(c) O_2 is required
(d) An anaerobic reaction

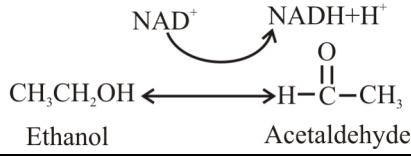
AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Fermentation is a metabolic process that does not require oxygen. In fermentation, glucose is broken down to pyruvate, but the pyruvate is not completely oxidised to carbon dioxide and water. The net gain of energy in fermentation is 2ATP molecules, and it involves the production of ethanol or lactic acid.
Fermentation does not use oxygen; thus it is "anaerobic" reaction.

63. Find out in which of the following enzymatic reactions, NADH is converted to NAD:
(A) Acetaldehyde → Ethanol
(B) Glyceraldehyde 3 – Phosphate → 3 – phosphoglyceric acid
(C) Pyruvic acid → lactic acid
(D) Oxalosuccinic acid → α-ketoglutaric acid
(E) α-ketoglutaric acid → succinyl CoA
(a) B, C (b) D, E
(c) A, B (d) A, C

TS EAMCET-09.08.2021 Shift-II

Ans. (d) : The reduction of acetaldehyde to ethanol is an oxidation reduction reaction that occurs in the presence of alcohol dehydrogenase. In this reaction NAD is formed from $NADH+H^+$.
• Under anaerobic condition , pyruvic acid is converted to lactate in lactate fermentation by using the enzyme lactate dehydrogenase (LDH). In this reaction NAD is formed from $NADH+H^+$.



64. Fermentation differs with aerobic respiration except one in the following?
(a) Partial breakdown of glucose
(b) Net gain is 2 ATP
(c) NADH oxidation is slow
(d) Glucose degraded into CO_2 & H_2O

AP EAPCET-07.09.2021 Shift-I

Ans. (d) : Difference between aerobic respiration and fermentation–
• Fermentation accounts for only a partial breakdown of glucose, whereas in aerobic respiration it is entirely degraded to CO_2 and H_2O.
• In fermentation, there is a net gain of only two molecules of ATP for each molecule of glucose degraded to pyruvic acid whereas many more molecules of ATP are generated under aerobic conditions.
• NADH is oxidized to NAD^+ rather slowly in fermentation however the reaction is very vigorous in case of aerobic respiration.

65. Select a suitable name for this process :
$C_6H_{12}O_6 + 2ADP + 2Pi \rightarrow 2C_2H_5OH + 2ATP + 2CO_2 \uparrow$
(a) Alcoholic fermentation
(b) Photorespiration
(c) Lactate fermentation
(d) Aerobic respiration

Karnataka CET-2012

Ans. (a) :

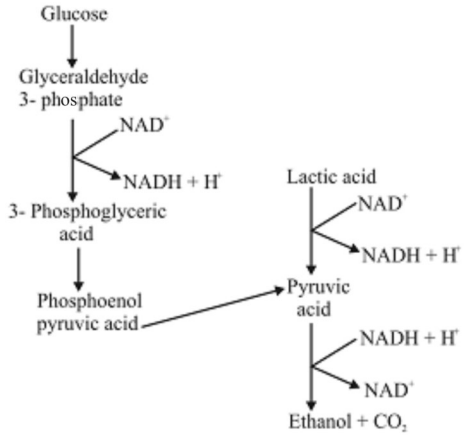
$$\underset{\text{Glucose}}{C_6H_{12}O_{6(aq)}} \xrightarrow{\text{yeast}} 2\underset{\text{Ethanol}}{CH_3CH_2OH_{(aq)}} + 2\underset{\text{carbondioxide}}{CO_{2(9)}} \uparrow$$

• Alcoholic fermentation is also referred to as ethanol fermentation, is a biological process by which sugar is converted into alcohol and carbon dioxide. Yeasts are responsibile for this process and oxygen is not necessary, which means that alcoholic fermentation is an anaerobic process. This type of fermentation is used to make bread, wine, and biofuels to generate energy.

66. The energy-releasing process in which the substrate is oxidized without an external electron acceptor is called:
(a) aerobic respiration (b) glycolysis
(c) fermentation (d) photorespiration

AIPMT-2010, 2008

Ans. (c) : During fermentation, the respiratory substrate is partially oxidized without on external electron acceptor. During aerobic respiration, oxygen acts as an external electron acceptor. Glycolysis is the common step in both aerobic and anaerobic respiration (fermentation.)



67. Continuous addition of sugars in 'fed batch' fermentation is done to:
(a) degrade sewage (b) produce methane
(c) obtain antibiotics (d) purify enzymes

AIPMT (Screening)-2011

Ans. (d) : Purify enzymes.
This is due to the fact that sugars facilitate the metabolism of most of the microorganisms and provide the substrate for respiration and also as a source of energy.

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68. Ethanol is commercially produced through a particular special of:
(a) Aspergillus (b) Saccharomyces
(c) Clostridium (d) Trichoderma

AIPMT (Screening)-2011

Ans. (b) : Ethanol is generally created through a particular species of yeast Saccharomyces. It is one of the most essential characteristics` of ethanol producing yeast that is ethanol tolerance. It is a common renewable biofuel.

69. The most common substrate used in distilleries for the production of ethanol is:
(a) Molasses (b) Corn meal
(c) Soyabean (d) Ground gram

AIPMT (Screening)-2011

Ans. (a) : The most common substrate used in distilleries for the production of ethanol is molasses. This process of fermentation occurs with the help of *Saccharomyces cerevisiae*, a particular species of yeast.

70. Formation of alcohol by yeast is:
(a) anaerobic process (b) extracellular
(c) microbial (d) All of the above

AMU-2011

Ans. (d) : Formation of alcohol by yeast is an anaerobic process, meaning it occurs in the absence of oxygen. It is also an extracellular process, as yeast cells release alcohol (ethanol) outside of their cell walls during fermentation. This process is indeed microbial, as it involves the activity of microorganisms like yeast.
Hence, all of the above options are correct regarding the formation of alcohol by yeast.

71. Rice wine is:
(a) Beer (b) Wine
(c) Cider (d) Sake

AIIMS-2011

Ans. (d) : Rice wine is a popular alcoholic beverage used for both drinking and cooking. It is known as sake. Rice wine is made by the fermentation of rice starch that is converted to sugars. It is also known as Japanese rice wine because it's originated from Japan.

72. Aerobic respiration produces more usable chemical energy than fermentation, because fermentation involves:
(a) Formation of lactic acid
(b) Complete oxidation of food
(c) Partial oxidation of food
(d) Evolution of CO_2 and alcohol

AIIMS-1995, 2014

Ans. (c) : In aerobic respiration complete oxidation of food occur while in anaerobic respiration partial oxidation of food occur.
Aerobic respiration are forms more usable chemical energy than fermentation.
Number of ATP after aerobic respiration = 38 ATP
Number of ATP form after anaerobic respiration = 2 ATP.

73. When yeast ferments glucose, the products obtained are:
(a) ethanol and CO_2 (b) methanol
(c) ethanol and water (d) water and CO_2

AIPMT-1994

Ans. (a) : At the time of fermentation, yeast cell convert cereal- and convert sugar into ethanol and CO_2. At the same time hundreds of secondary metabolites that influence the aroma and taste of beer are formed.

74. In lactic acid fermentation, the number of ATP formed by the oxidation of NADH is:
(a) eight (b) six
(c) three (d) nil

AMU-2014

Ans. (d) : Lactic acid fermentation occurs in lactic acid bacteria, such as fungi muscles of vertebrates. NADH formed during glycolysis is often used. ATP formation does not occur during regeneration of NAD^+. So, it does not produce ATP. Hence, in lactic acid fermentation, the number of ATP formed by the oxidation of NADH is nil.

75. Which of the following shows fermentation?
(a) Yeast (b) Gymnosperm
(c) Angiosperm (d) None of these

Rajasthan PMT-1999

Ans. (a) : Fermentation - It is a cellular respiration process that happens in absence of O_2 for example anaerobic respiration.
- It takes place in the cytoplasm.
- Lactic acid fermentation and alcoholic fermentation are the two types of anaerobic respiration.
- Alcoholic fermentation observed in fungi such as Yeast, Rhizopus and bacteria.
- Lactic acid fermentation is found in lactic acid bacteria such as lactobacillus, some fungi and muscles of vertebrates

76. Alcoholic fermentation takes place in the presence of:
(a) maltase (b) zymase
(c) amylase (d) invertase

Rajasthan PMT-2003

Ans. (b) : Alcoholic fermentation takes place in the presence of zymase. Zymase is an enzyme complex that changes the simple sugars into ethanol and carbon dioxide.

$$C_6H_{12}O_6 \xrightarrow[\text{Yeast}]{\text{Zymase}} 2C_2H_5OH + 2CO_2$$

77. Fermentation is represented by equation:
(a) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2 + 673$ kcal
(b) $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 21$kcal
(c) $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_2 + 6O_2$
(d) $6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6O_2$

CG PMT-2004

Ans. (b) : The process of fermentation occur during anaerobic respiration. In fermentation an organism like (yeast) converts carbohydrate into alcohol or acid. Yeast performs fermentation to obtain energy by converting sugar into alcohol. Lactic acid converts carbohydrates into lactic acid.

$$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$$

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D. Aerobic Respiration

78. How many molecules of $FADH_2$ are produced per every glucose molecule in aerobic respiration

(a) Four (b) Three
(c) One (d) Two

TS EAMCET-10.05.2023, Shift-II

Ans. (d) : During aerobic respiration, 2 molecules of $FADH_2$ are produced per every glucose molecules in the kreb's cycle. The kreb cycle is the second stage of aerobic respiration and it takes place in the mitochondria.

In the kreb's cycle, pyruvate molecules from glycolysis are oxidised to carbon dioxide and water.

This process releases energy, which is used to produced ATP and NADH. $FADH_2$ is a molecule that carries electrons from the kreb cycle to the electron transport chain. So, the total number of molecules of $FADH_2$ produced per every glucose molecule in aerobic respiration is 2.

79. The net ATP formed by substrate level phosphorylation, oxidation of NADH + H^+ and oxidation of $FADH_2$ during aerobic respiration of five glucose molecules are

(a) 10, 70, 10 (b) 20, 140, 20
(c) 20, 160, 10 (d) 10, 140, 10

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : During aerobic respiration of five glucose molecules are–

- Substrate-level phosphorylation produced 20 ATP
- Oxidation of NADH + H^+ produces 140 ATP.
- Oxidation of $FADH_2$ produces 20 ATP. In total, 180 ATP is formed through these process.

80. In which of the following reactions of TCA cycle of aerobic respiration NAD is reduced to NADH + H^+ ?

A. Oxidation of isocitric acid
B. Oxidation of α ketoglutaric acid
C. Osication of succinic acid
D. Oxidation of malic acid

(a) AB (b) AC
(c) BCD (d) ABD

TS EAMCET-11.05.2023, Shift-II

Ans. (d) : NAD is reduced to NADH + H^+ in the following reaction of TCA cycle–

- Oxidation of isocitric acid – Isocitric acid is oxidised to alpha – ketoglutaric acid during this process, NAD is reduced to NADH + H^+.
- Oxidation of α-keto glutaric acid is oxidized to succinyl – CoA. NAD is also reduced to NADH + H^+ during this reaction.
- In the oxidation of malice acid, NAD is to NADH + H^+ in the kreb cycles.

81. Consider the following statements regarding photosynthesis and respiration in plants and select the correct option.

I. RuBisCO has high affinity to oxygen in low CO_2 concentration.
II. The Calvin pathway occurs in the chloroplast of bundle sheath cells of C_4 plants.
III. Yeast poison themselves when the concentration of alcohol reaches 7%.
IV. Oxygen is a final hydrogen acceptor during aerobic respiration.

(a) Statements II & IV are correct, I is wrong.
(b) Statements I & II are correct, IV is wrong.
(c) Statements I & III are correct, II is wrong.
(d) Statements I & IV are correct, III is wrong.

Karnataka CET-2020

Ans. (d) : RuBisCO is the most abundant enzyme found on earth. Its full form is Ribulose – 1, 5- bisphosphate carboxylase oxygenase. It performs the process of carbon fixation in C_3 cycle. RuBisCO acts as an oxygenase in low CO_2 concentration.

82. In the mitochondrial matrix, pyruvate is first converted to acetyl CoA by a process called:

(a) substrate level phosphorylation
(b) dehydrogenation
(c) oxidative decarboxylation
(d) condensation

Tripura JEE-2019

Ans. (c) : In the mitochondrial matrix, pyruvate is the first converted to acetyl CoA by a process called oxidative decarboxylation.

Dehydrogenation is the process by which hydrogen is removed from an organic compound to form a new chemical

Condensation is the process by which water vapor in the air is changed into liquid water.

83. Which one of the following metabolic conversions requires oxygen?

(a) Glucose to pyruvate
(b) Glucose to CO_2 and ethanol
(c) Glucose to lactate
(d) Glucose to CO_2 and H_2O

KVPY SA-2019

Ans. (d) : Cellular respiration or respiration is the process by which cells breakdown glucose energy. CO_2 and H_2O are also released in the process. This can happen in the presence of oxygen it is known aerobic respiration.

- During glycolysis, glucose is converted into pyruvate
- Yeast converts glucose to ethanol and CO_2 by anaerobic fermentation

$$\text{Glucose} \xrightarrow{\text{Fermentation}} \text{Ethanol} + CO_2$$

The conversion of glucose to lactate is known as anaerobic glycolysis (it does not require O_2)

84. If Respiratory substrate like sucrose dipeptide protein and lipid are present in living cell, which substrate is utilized first?

(a) Sucrose (b) Lipid
(c) Protein (d) Dipeptide

GUJCET-2018

Ans. (a): Sucrose:– The compound oxidized during the process of respiration are called as respiratory substrates. Respiratory substrates like sucrose, dipeptide, protein and lipid are present in living cell. Sucrose (carbohydrate) are utilized first, because it is primary respiratory substrate.

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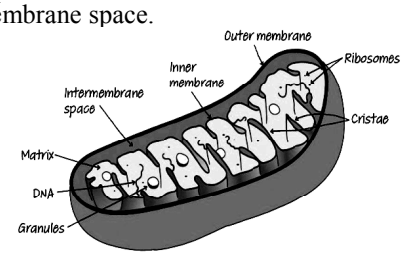
85. In mitochondria, protons accumulate in the
(a) Matrix (b) Outer membrane
(c) Inner membrane (d) Intermembrane space
AIPMT (Mains)-2011

Ans. (d) : During aerobic respiration, electrons move through the electron transport chain in mitochondria. As electron move, they loose energy, which is used to pump protons from the mitochondrial matrix to the intermembrane space.



86. Glycolate induces opening of stomata in : -
(a) Presence of oxygen (b) Low CO_2 conc.
(c) High CO_2 (d) CO_2 absent
AIPMT-2001

Ans. (b) : Zelitch (1963) suggested that glycolic acid is formed in the guard cells. This acid is formed under low concentration of CO_2.
- Glycolate produced gives rise to carbohydrates, under this condition osmotically active material is produced and ATP synthesis also takes place.
- ATP is formed during glyoxylate-glycolate shuttle.
- This ATP helps in the active pumping of water in the guard cells and stomata open. Stomata close when this process is reversed.

87. In photosynthesis $NADPH_2$ is formed but in respiration its forms during:
(a) HMP (b) ETS
(c) Krebs cycle (d) None of these
UP CPMT-2006

Ans. (a) : $NADP^+$ and NAD^+ are most important coenzymes in cellular metabolism. These both compound's contain derivatives of vitamin nicotinic acid, function as electron carriers.
$NADPH_2$ is formed during light reaction of photosynthesis and also formed during hexose monophosphate shunt (HMP shunt) of glucose oxidation.
$NADPH_2$ is formed during the aerobic respiration **i.e. kreb's cycle**.

88. Ganong's respiroscope is used to demonstrate……
(a) evolution of oxygen during photosynthesis.
(b) evolution of carbon dioxide during fermentation.
(c) production of carbon dioxide during aerobic respiration.
(d) production of heat during aerobic respiration.
Karnataka CET-2004

Ans. (c) : Ganong's respiroscope is used to demonstrate the production of carbon dioxide during aerobic respiration. The ganong's respiroscope experiment uses germinating seeds to study the evolution of CO_2 during the process of aerobic respiration. Germinating seeds absorb O_2 from the respiroscope and liberate CO_2.

89. Which one is product of aerobic respiration?
(a) Malic acid (b) Ethyl alcohol
(c) Lactic acid (d) Pyruvic acid
WB JEE-2009

Ans. (a) : The product of aerobic respiration is malic acid. It is formed during Krebs cycle.

$$\text{fumaric acid} \xrightarrow[\text{fumerase}]{H_2O} \text{malic acid}$$

In anaerobic respiration ethyl alcohol and lactic acid are formed.

90. In yeast during anaerobic respiration how many glucose molecules are required for production of 38 ATP?
(a) 1 (b) 2
(c) 19 (d) 38
Rajasthan PMT-2004

Ans. (c) : In yeast during anaerobic respiration, 19 glucoses molecules are required for production of 38 ATP. This is because each glucose molecule produce 2 ATP molecules in anaerobic respiration So, to produce 38 ATP we need 38/2 = 19 glucose molecule.

91. Number of water molecules produced per molecule of glucose during aerobic respiration is:
(a) 12 (b) 8
(c) 6 (d) 10
Haryana PMT-2002

Ans. (c) : Number of water molecules produced per molecule of glucose during aerobic respiration is 6.
$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 38$ ATP (energy).
The glucose reacts in the presence of six oxygen molecules giving 6 carbon dioxide molecules and six water molecules and energy is released in the form of ATP.

92. In the mesophyll cells of CAM plants, CO_2 fixation during day occur through:
(a) RuBP-oxygenase
(b) PEP-carboxylase
(c) RuBP-carboxylase
(d) Both RuBP carboxylase and PEP-carboxylase
Uttarakhand PMT-2006

Ans. (c) : In the mesophyll cells of CAM plants, CO_2 fixation during day occur through RuBP-carboxylase.

93. During aerobic respiration the final electron acceptor is:
(a) Cyto b (b) $NADH_2$
(c) Water (d) Oxygen
MHT CET-2016
Punjab MET-2003

Ans. (d) : ATP is formed during the process of oxidative phosphorylation in the mitochondria which is a part of aerobic respiration.
• The electron transport chain plays an important role in this process. The electrons move through a series of electrons donars and carriers that lead to formation of a potential gradient. This gradient helps in ATP synthesis. During this process, O_2 is reduced by the hydrogen from NADH and it finally accepts the electrons of the chain.
Thus, it is the terminal electron acceptor that results in the formation of water molecules.

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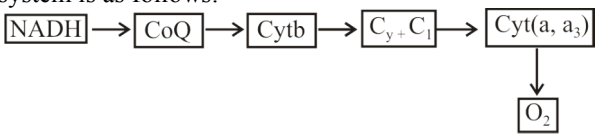
Therefore, during aerobic respiration the final electron acceptor is oxygen.
The sequence of compounds in the hydrogen transport system is as follows:



94. How much of the energy released during aerobic respiration is approximately conserved in the form of ATP?
(a) 20% (b) 40%
(c) 60% (d) 100%
MHT CET-2015

Ans. (b) : Energy gain in complete oxidation of one mole of glucose is:–

$$\text{Glycolysis} \longrightarrow 2ATP + 2NADH_2 = 8ATP$$
$$\downarrow \text{ETS}$$
$$6ATP$$
$$\text{Intermediate step} \longrightarrow 2NADH_2 \xrightarrow{\text{ETS}} 6ATP$$
$$\text{Krebs cycle} \longrightarrow NADH_2 + 2ATP = 24\ ATP$$
$$\text{ETS} \quad \text{ETS}$$
$$18\ ATP \quad 4\ ATP$$
$$\text{Total} = 38\ ATP$$
$$1\ ATP = 7.3\ kcal$$
$$38\ ATP = 38 \times 7.3 = 277.4\ kcal$$

Therefore, efficiency of aerobic respiration is

$$\frac{277.4}{673} \times 100 \approx 40\%$$

Hence, approx 40% of energy is released during aerobic respiration is conserved in the form of ATP.

95. The process by which there is inhibition of aerobic respiration by atmospheric O_2 is:
(a) pasteurs effect (b) calvins effect
(c) darwins effect (d) none of the above
DUMET-2004

Ans. (a) : Louis Pasteur observed that when yeast is exposed to aerobic conditions (in the presence of O_2), their glucose consumption and ethanol production drop, whereas in the presence of O_2 glucose consumption increases several fields. Reason for the decrease in consumption of glucose is that fermentation results in the production of 2 ATPs per glucose whereas aerobic respiration gives 32 ATPs per glucose. Hence, for the generation of same amount ATP to perform essential metabolic activities; more consumption of glucose is needed in anaerobic condition.

96. During aerobic respiration, acetyl Co-A is synthesized in:
(a) Cytosol
(b) Mitochondrial matrix
(c) Glyoxysomal matrix
(d) Perichondrial space
AMU-2014

Ans. (b) : During aerobic respiration, acetyl Co-A is synthesized in mitochondrial matrix. Acetylcoenzyme is formed by oxidative decarboxylation of pyruvate, the end product of glycolysis. Glycolysis takes place in cytosol of the cell but formation of acetyl Co-A occurs in mitochondrial matrix.

97. One mole glucose, on complete oxidation, yields energy:
(a) 686 cal (b) 68,600 cal
(c) 6,86,000 cal (d) 68,60,000 cal
CG PMT-2004

Ans. (c) On complete oxidation of 1 gram of glucose molecule provides 686000 cal of energy.
1 Kcal = 1000 calories
Therefore, 686 kcal = 686000cal

98. Which of the following stages of aerobic respiration takes place in the matrix of the mitochondria?
(i) Oxidative decarboxylation of pyruvic acid
(ii) Glycolysis
(iii) Krebs cycle
(iv) Oxidative phosphorylation
(a) I and II only (b) II and III only
(c) III and IV only (d) I and III only
(e) I and IV only
Kerala PMT-2013

Ans. (d) : Oxidative decarboxylation of pyruvic acid and Kreb's cycle take place in the matrix of the mitochondria.
Glycolysis occurs in cytosol of the cell.
Oxidative phosphorylation is the process of ATP synthesis by energy liberated during oxidation of reduced co-enzymes (NADH, $FADH_2$) produced in respiration. It occurs in inner mitochondrial membrane.

E. Krebs Cycle

99. Krebs cycle takes place in
(a) cytoplasm (b) chloroplast
(c) nucleus (d) mitochondria
Manipal-2012 / AMU-2009
AFMC-2002 /JIPMER-2001
Rajasthan PMT-2000

Ans. (d) : The Krebs cycle, also known as the citric acid cycle or tricarboxylic acid cycle, takes place in the mitochondria of eukaryotic cells. It is a crucial part of cellular respiration, where energy is generated by breaking down glucose and other molecules to produce ATP.

100. In Krebs's cycle, reaction representing substrate level phosphorylation is
(a) G3p → 1, 3 DPGA
(b) Succinyl CoA → Succinic acid
(c) Succinic acid → Fumaric acid
(d) α – ketoglutarate → Succinyl CoA
TS EAMCET 10.05.2023 Shift-I

Ans. (b) : Substrate level phosphorylation is a type of cellular respiration that occurs directly in the substrate, cutouts the need for an electron transport chain. In the case of kreb's cycle, the substrate is succinyl Co A. When succinyl Co A is converted to succinic acid, a high-energy phosphate group is transferred from succinyl Co-A to ADP, forming ATP.

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101. How many times decarboxylation occurs during each TCA cycle?

(a) Once (b) Twice
(c) Thrice (d) Many

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Carboxyl group is removed from a compound along with the release of carbon dioxide is called decarboxylation.

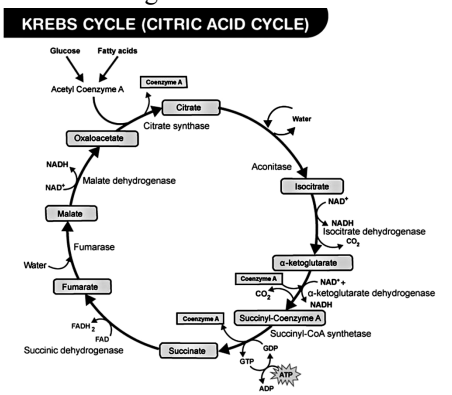
- In the Krebs cycle decarboxylation occurs in two step.
- First decarboxylation occurs when oxalosuccinic acid is converted in α-ketoglutaric acid.
- Second decarboxylation occurs when α-ketoglutaric acid is converted into succinyl CoA.

102. The 5-C compound formed during TCA cycle is:

(a) α-ketoglutaric acid (b) Oxalo succinic acid
(c) Succinic acid (d) Fumaric acid

NEET (Re-Exam)-04.09.2022

Ans. (a) : The only 5-carbon compound formed during TCA cycle is α-Ketoglutaric acid.



103. How many ATP molecules would be produced from complete aerobic breakdown of one molecule of acetyl Co-A?

(a) 38 (b) 15
(c) 36 (d) 12

MHT CET 5.10.2020 Shift-I

Ans. (d) : In the process of aerobic respiration-
1 glucose molecule forms 2 molecule of pyruvic acid.
Each pyruvic acid is converted to Acetyl CoA and enters in Krebs cycle
From one Acetyl CoA, following formation takes place
3 $NADH_2$ = 9ATP
1 $FADH_2$ = 2ATP
1GTP = 1ATP
Total = 12ATP
So, total 12ATP will be produced from complete aerobic breakdown of one molecule of acetyl CoA.

104. How many oxidation steps are involved in aerobic respiration during acetylation and Krebs cycle?

(a) Two (b) Four (c) Three (d) Five

MHT CET-07.10.2020 Shift-I

Ans. (b) : There are four oxidation steps are involved in aerobic respiration during acetylation and Krebs cycle. (A) Isocitrate to alpha-Ketoglutarate
(B) Alpha-ketoglutarate to succinyl Co-A
(C) Succinate to Fumarate
(D) Malate to oxaloacetate

105. In C_4 plants, C_3 cycle takes place in

(a) Mesophyll cells
(b) Bulliform cells
(c) Companion cells
(d) Bundle sheath cells

Karnataka CET-2020

Ans. (d) : In C_4 plants, C_3 cycle takes place in bundle sheath cells. C_3 and C_4 cycle is a type of dark reaction of photosynthesis. The cell present between the upper and lower epidermis are called the mesophyll cells. In C_4 plants the fixation of carbon happens in the mesophyll cells, where as the C_3 cycle or Calvin cycle occurs in the bundle sheath. In this way, the C_4 plants are able to reduce the water loss to the transpiration. Sugarcane, corn and sorghum are example of C_4 plants.

106. Identify the dehydration and oxidation reactions among the following:

i. oxaloacetic acid + Acetyl CoA→ Citric acid + Coenzyme A
ii. Fumaric acid +H_2O → Malic acid
iii. Citric acid → Cis-aconitic acid
iv. ISocitric acid + NAD^+→ oxalosuccinic acid + NADH
v. Malic acid +NAD^+→ Oxaloacetic acid +NADH

The correct combination is

(a) iii, iv, v (b) i, ii, iii, iv
(c) ii, iii, iv, v (d) ii, iii, v, i

TS EAMCET-09.05.2019 Shift-I

Ans. (a) : (III) Citric acid looses water molecule to yield cis-aconitic acid in the presence aconitase enzyme.

Citric acid $\xrightarrow{\text{Aconitase}}$ Cis-aconitic acid +H_2O

• Citric acid, cis-aconitic acid and isocitric acid contain three carboxylic acid groups.

(iv) Isocitric acid undergoes oxidation in the presence of dehydrogenase enzyme to produced succinic acid.

Isocitric acid + NAD^+ $\xrightarrow{\text{dehydrogenase}}$ Oxalosuccinic acid + NADH + H^+

(v) Malic acid undergoes oxidation in the presence of malic dehydrogenase to form OAA.

Malic aicd + NAD^+ $\xrightarrow[\text{dehydrogenase}]{\text{malic}}$ OAA + NADH + H^+.

107. In the following reaction, identify X and Y respectively :

Pyruvic acid + CoA + NAD^+ $\xrightarrow[X]{Mg^{2+}}$ Y + CO_2 + NADH + H^+

(a) Water, Acetyl CoA
(b) Acetyl CoA, Pyruvate dehydrogenase
(c) Pyruvate dehydrogenase, Acetyl CoA
(d) Pyruvate dehydrogenase, Oxalo-acetic acid

Karnataka CET-2018

Ans. (c) : The pyruvate dehydrogenase bring about decarboxylation of pyruvic acid to produce molecule of acetyl CoA which is further utilized in the Krebs cycle. The krebs cycle or TCA cycle (tricarboxylic acid cycle) or citric acid cycle is a series of enzyme catalysed reactions that occur in the mitochondrial matrix, where acetyl - CoA is oxidized to form carbon dioxide and coenzymes are reduced, which generate ATP in the electron transport chain.

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108. Which statement is wrong for Krebs' cycle?

(a) There are three points in the cycle where NAD+ is reduced to NADH + H+

(b) There is one point in the cycle where FAD+ is reduced to FADH

(c) During conversion of succinyl CO-A to succinic acid, a molecule of GTP is synthesised

(d) The cycle starts with condensation of acetyl group (acetyl CO-A) with pyruvic acid to yield citric acid

NEET-2017

Ans. (d) : The kreb's cycle starts with condensation of acetyl CoA with oxaloacetic acid and water to provide citric acid. Each turn of the cycle forms three NADH molecules and one $FADH_2$ molecule. One GTP molecule is synthesised during conversion of succinyl CoA to succinic acid.

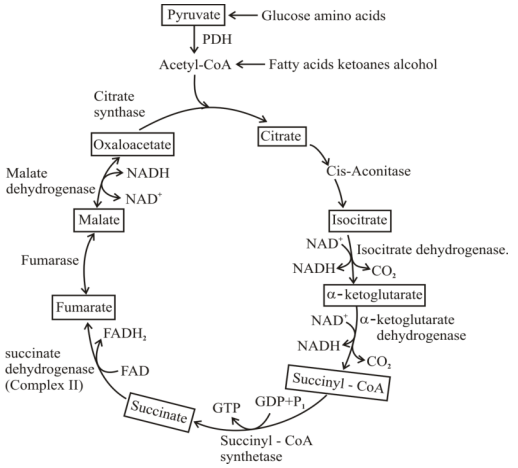


Fig :- Kreb's cycle

109. A competitive inhibitor of succinic dehydrogenase is :

(a) α-ketoglutarate (b) malate

(c) malonate (d) oxaloacetate

AIPMT-2008

Ans. (c) : An inhibitor is a type of chemical compound that supply enzyme activity. A competitive inhibitor shows structural similarity with the substrate and prevents the binding of the substrate to the enzyme.The competitive inhibitor of succinic dehydrogenase is malonate. It resembles the substrate succinate and binds to the active site of the enzyme, thereby inhibiting enzyme activity.

110. In Krebs' cycle GTP is formed by

(a) oxidative phosphorylation

(b) substrate level phosphorylation

(c) photophosphorylation

(d) decarboxylation

UP CPMT-2011

Ans. (b): GTP is formed by substrate – level phosphorylation is the Kreb cycle. Substrate level phosphorylation is a type of ATP synthesis that occurs directly form the energy released by chemical reaction. In the Kreb cycle, GTP is formed during the conversion of succinyl – Co-A to succinate. This reaction is catalyzed by the enzyme succinyl – CoA synthetase, and it requires the hydrolysis of GDP.

111. Which one is not correct about Krebs' cycle?

(a) It occurs in mitochondria.

(b) It starts with six carbon compound

(c) It is also called citric acid cycle.

(d) The intermediate compound which links glycolysis with Krebs' cycle is malic acid.

Karnataka CET-2007

Ans. (d) : The intermediate compound that links glycolysis with krebs cycle is acetyl-CoA, not malic acid. Acetyl-CoA is formed from the oxidative decarboxylation of pyruvate, which is the end product of glycosis. Acetyl-CoA then enters the Krebs cycle by combining with oxaloacetate to form citrate, a six carbon compound. Malic acid is one of the intermediates of the Krebs cycle.

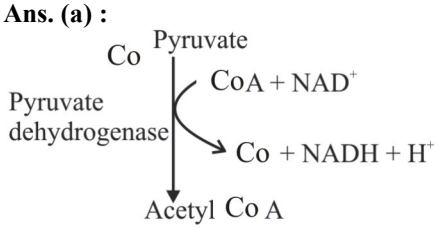
112. Biological oxidation in Krebs cycle involves:

(a) O_2 (b) N_2

(c) CO_2 (d) SO_2

WB JEE-2006

Ans. (a) :



There is no need of oxygen in Krebs cycle directly but it can only take place when oxygen is present because it depends on by products from the electron transport chain which needs oxygen.

113. Match the items in column I with column II.

Column -I	Column II
A. Grana	**Krebs cycle**
B. Stroma	**Light reaction**
C. Cytoplasm	**Dark reaction**
D. Matrix	**Glycolysis**

(a) A - 3 B - 2 C - 1 D - 4

(b) A- 1 B - 2 C - 3 D - 4

(c) A - 2 B - 3 C - 4 D - 1

(d) A - 4 B -1 C - 2 D - 3

VMMC-2011

Ans. (c) :

	Column-I	Column-II
A.	Grana	Light reaction
B.	Stroma	Dark reaction
C.	Cytoplasm	Glycolsis
D.	Matrix	Kreb's cycle

114. Citric acid cycle is the alternate name of which of the following?

(a) HMP shunt (b) Glycolysis

(c) TCA cycle (d) Calvin cycle

WB JEE-2009

Ans. (c) : Citric acid cycle is commonly known as Kreb's cycle or TCA (tricarboxylic Acid cycle)

• HMP shunt (Hexose monophosphate pathway) is also called pentose phosphate pathway

• Calvin cycle is also known as the C_3 cycle or light-independent or dark reaction of photosynthesis. Calvin

@apna_pdf

cycle is the process by which carbon fixation is done to form carbohydrates during photosynthesis.

• EMP pathway is the other name of glycolysis it is named after the 3 scientist Embden, Meyerhof and Parnas who gave the concept of glycolysis. It is the pathway of glucose catabolism.

115. Which of these is not a ketone body?
(a) Acetoacetic acid
(b) Acetone
(c) Succinic acid
(d) Betahydroxy butyric acid

UP CPMT-2004

Ans. (c) : Ketone bodies are produced by the liver and used peripherally as an energy source when glucose is not readily available.
Hence, succinic acid is not a ketone body

116. Which of the following is not an intermediate of Krebs cycle?
(a) Acetyl Co-A (b) Citric acid
(c) Succinic acid (d) Lactic acid

BCECE-2005

Ans. (d) : The intermediate of Kreb's cycle is citric acid, acetyl Co-A succinic acid. Lactic acid is not an intermediate of Krebs cycle. Lactic acid is formed in muscle cells and red blood cell (RBC).

• Lactic acid is fuel for cells during intense exercise.

117. The pyruvic acid formed during glycolysis is oxidized to CO_2 and H_2O in a cycle called:
(a) Calvin cycle (b) Nitrogen cycle
(c) Hill reaction (d) Krebs cycle

J&K CET-2008

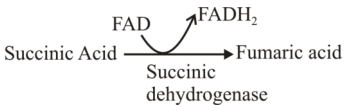
Ans. (d) : The Pyruvic acid formed during glycolysis is oxidized to CO_2 and H_2O in a cycle called Krebs cycle.

- Krebs cycle essentially involves the oxidation of acetyl CoA to CO_2 and H_2O
- Krebs cycle is the central metabolic pathway.
- The TCA cycle is the final common oxidative pathway for carbohydrates, fats and amino acid.
- Nitrogen cycle is a biochemical process through which nitrogen is converted in number of form, passing from the atmosphere to the soil to organism and back into the atmosphere.

118. FAD is electron acceptor in the citric acid cycle during the oxidation of:
(a) Malic acid to oxaloacetic acid
(b) Succinic acid to malic acid
(c) Citric acid to alpha-ketoglutaric acid
(d) Alpha-ketoglutaric acid to succinic acid
(e) Oxaloacetic acid to citric acid

Kerala PMT-2015
WB JEE 2009

Ans. (b) :

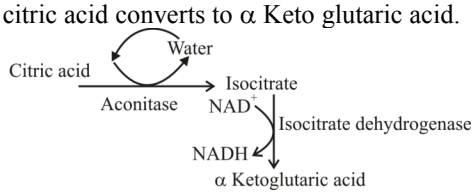


In the Krebs cycle at eighth step in which succinic acid converts in to fumaric acid in the presence of enzyme succinic dehydrogenase release energy and produce FADH that gives 2ATP.

119. In citric acid cycle, decarboxylation occurs when:
(a) citric acid converts to α-ketoglutaric acid
(b) succinic acid converts to malic acid
(c) malic acid converts to oxaloacetic acid
(d) oxaloacetic acid converts to citric acid

AMU-2010

Ans. (a) : In the citric acid cycle decarboxylation occur when citric acid converts to α Keto glutaric acid.



120. Which of the following is true for TCA cycle is eukaryotes?
(a) takes place in mitochondrion
(b) produces no ATP
(c) takes place in Golgi complex
(d) independent of electron transport chain

KVPY SB & SX-2012

Ans. (a) : TCA cycle or Krebs cycle takes place in the mitochondria in the cell. The number of ATP molecules produced in the Krebs cycle is 2ATP.

121. Total yield in one Krebs′ cycle
(a) $3FADH_2$, $2NADH_2$, 1ATP
(b) $2FADH_2$, $2NAD_2$, 2ATP
(c) $2NADH_2$, $1FADH_2$, 2ATP
(d) $3NADH_2$, $1FADH_2$, 1ATP

CG PMT-2006

Ans. (d) : Total yield in one kreb's cycle is 12 ATP
1 NADH + 1 NADH + 1 ATP + 1 $FADH_2$ + 1 NADH = 12 ATP
OR
3 $NADH_2$, 1 $FADH_2$, 1 ATP = 12 ATP

122. In which one of the following do the two names refer to one and the same thing?
(a) Krebs' cycle and Calvin cycle
(b) Tricarboxylic acid cycle and citric acid cycle
(c) Citric acid cycle and Calvin cycle
(d) Tricarboxylic acid cycle acid urea cycle

BHU PMT (Screening)-2011

Ans. (b) : Krebs cycle is also knows as citric acid cycle. It is the second phase of aerobic respiration and starts with the condensation of acetyl CoA with OAA forms citrate, the first tricarboxylic acid of krebs cycle.
Therefore, it is also called as citric acid cycle and tricarboxylic acid cycle.

123. Match the compounds given in Column I with the number of carbon atoms present in them which are listed under column II. Choose the answer which gives the correct combination of alphabets of the two columns.

Column-I	Column-II
(A) Oxaloacetate	1. 6-C compound
(B) Phosphoglycer-aldehyde	2. 5-C compound
(C) Isocitrate	3. 4-C compound
(D) α-Ketoglutarate	4. 3-C compound
	5. 2-C compound

@apna_pdf

(a) A-4 B-5 C-2 D-3
(b) A-3 B-4 C-1 D-2
(c) A-3 B-5 C-1 D-2
(d) A-2 B-4 C-1 D-5

VMMC-2015 / Manipal-2009

Ans. (b) :

	Column I	Column II
A	Oxaloacetate	4 Carbon compound
B	Phosphoglyceradehyde	3 Carbon compound
C	Isocitrate	6 Carbon compound
D	Alpha-ketoglutarate	5 Carbon compound

124. Respiratory quotient during early stages of germination of castor seed is:
(a) one (b) more than one
(c) zero (d) less than one

AP EAMCET-1997

Ans. (d) : Respiratory substrate is less than one in the case of germinating of castor seed. Fats generally have an R.Q value less than one it is because of more oxygen consumed than the number of CO_2 eliminated.
- Organic acid has respiratory quotient is more than one
– R.Q of carbohydrate is approximately one.
– R.Q is zero in succulent plants.

$$R.Q = \frac{\text{Volume of } CO_2 \text{ expelled}}{\text{Volume of } CO_2 \text{ consumed}}$$

125. Krebs cycle was discovered by Krebs in pigeon muscles in 1940. Which step is called gateway stem/link reaction/transition reaction in respiration?
(a) Glycolysis
(b) Formation of acetyl-CoA
(c) Citric acid formation
(d) ETS terminal oxidation

AFMC-2006

Ans. (b) : The gateway step , link reaction, or transition reaction is the step in respiration that links glycolysis to the Krebs cycle. This step is the formation of acetyl – CoA from pyruvate. Acetyl CoA is the substrate for the Krebs cycle and it is also the molecule that carries energy from glycolysis to the Krebs cycle.

126. Most of the biological energy is supplied by mitochondria through:
(a) Breaking of proteins
(b) Reduction of NADP
(c) Breaking of sugar
(d) Oxidizing TCA substrate

AMU - 2008 / VMMC-2008,2006

Ans. (d) : Most of the biological energy is supplied by mitochondria through oxidizing TCA substrate.
The entire process of Krebs cycles which is located in the inner membrane of mitochondria is known as mitochondrial matrix. Krebs cycle or TCA cycle is a catabolic oxidation of organic substrates which results in increase of CO_2 and H_2O.

127. One turn of Krebs' cycle for the oxidation of 1 mole of sucrose produce how many ATP molecules.
(a) 12 (b) 24
(c) 22 (d) 11

CG PMT-2011

Ans. (a) : One mole of sucrose/glucose form 12 ATP molecules
In sucrose, there will be in all turns of Krebs cycle instead of two as in case of glucose and, therefore total ATP production will be two times more than glucose that is 12 ATP.

128. The Nobel Prize for the discovery of TCA cycle and ATP biosynthesis was awarded to:
(a) Hans Krebs
(b) Lipman
(c) Krebs and Lipman jointly
(d) Vishniae and Ochoa

CG PMT-2011

Ans. (c) : The Nobel Prize for the discovery of TCA cycle and ATP biosynthesis was awarded to Krebs and Lipman jointly.

129. The reaction which is catalyzed by a protein that is not found in the matrix of mitochondria is:
(a) conversion of pyruvic acid to acetyl Coenzyme-A
(b) oxidative decarboxylation of α-ketoglutaric acid
(c) oxidation of succinic acid
(d) cleavage of succinyl Coenzyme-A

AP EAMCET-2008

Ans. (c) : The reaction which is catalyzed by a protein that is not found in the matrix of mitochondria is oxidation of succinic acid.

F. ETS and Oxidative Phosphorylation

130. Choose the incorrect statement with reference to the cyclic electron transport
(a) PSI alone is functional
(b) Occurs in stroma lamella.
(c) Membrane of stroma lamellae lack NADP reductase enzyme
(d) Occurs when wavelength below 680 nm are available for e^- excitation.

AP EAPCET-22.05.2023, Shift-I

Ans. (d) : Cyclic electron transport occurs when light with wavelength above 680 nm (primarily absorbed by PSI) is available for electron excitation. This process allows plants to generate ATP without producing NADPH, and it is important to balancing the energy needs of the cell and the production of reducing equivalents for biosynthests.
Hence, the (d) one is incorrect.

131. This event occurs during electron transport system and oxidative phosphorylation of mitochondria
(a) Succinic dehydrogenase transfers electrons to NADH dehydrogenase
(b) $FADH_2$ donates directly to Cytochrome c reductase
(c) Cytochrome c reductase donates electrons directly to ATP synthase for the synthesis of ATP
(d) Oxygen acts as the final hydrogen acceptor

AP EAPCET-23.05.2023, Shift-I

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Ans. (d) : Oxygen is the final electron acceptor in the electron transport chain because it has the high-test oxidation potential. This means that it can accept electron with the highest amount of energy. When oxygen accepts electrons it combines with hydrogen ions to from water.

132. Which of the following statements are incorrect?

(a) Oxidation-reduction reactions produce proton gradient in respiration

(b) During aerobic respiration, role of oxygen is limited to the terminal stage

(c) In ETC (Electron Transport Chain), one molecule of NADH + H^+ gives rise to 2 ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules

(d) ATP is synthesized through complex V

NEET-2021

Ans. (c) : In ETC one NADH +H^+ produces 3 ATP while one $FADH_2$ produces 2 ATP molecules.

- During respiration, process of ATP synthesis that is established by oxidation-reduction reactions.
- A proton gradient is required for ATP synthesis that is established by oxidation-reduction reactions.
- ATP is synthesised via complex V.

133. Assertion (A) : When electrons move through the transport chain, protons are transported across the membrane.

Reason (R) : Because the primary acceptor of electron located towards the outside of the membrane, transfers its electrons to a H carrier (PQ).

The correct option among the following is Options:

(a) (A) is true, (R) is true and (R) is the correct explanation for (A)

(b) (A) is true, (R) is true but (R) is not the correct explanation for (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

TS EAMCET-09.08.2021 Shift-I

Ans. (a) : When electrons move through the transport chain, protons are transported across the membrane because the primary acceptor of electron located towards the outside of the membrane transfers its electrons to a H carrier (PQ).

As electrons move through the photosystems, protons are transported across the membrane. This happens because the primary accepter of electrons which is located towards the outer side of the membrane transfers its electron not to an electron carrier but to an H carrier hence, this molecule removes a proton from the stoma while transporting an electron. When this molecule passes on its electron to the electron carrier on the inner side of the membrane, the proton is released into the inner side or the lumen side of the membrane.

134. Which of the following is/are the product (s) of cyclic photophosphorylation?

(a) Both NADPH and H^+ (b) NADPH

(c) ATP (d) Both ATP and NADPH

KVPY SB & SX-2019 / Kerala PMT-2015

Ans. (c) : Cyclic photophosphorylation is process that uses light energy to produce ATP. It does not produce NADPH.

- NADPH is formed during non-cyclic photophosphorylation by NADP and H^+ .

135. ATP formation occurs through which of the following :

(a) Photophosphorylation

(b) Oxidative phosphorylation

(c) Substrate level phosphorylation

(d) All of these

AIIMS-26.05.2019 Shift-I

Ans. (d) : • Substrate-level phosphorylation is an exergonic reaction in which a phosphoryl group from a substrate is transferred to adenosine diphosphate (ADP or GDP) to produce adenosine triphosphate (ATP or GTP).

• Oxidative phosphorylation is the process that takes place through electron transport chain and establish a proton gradient, followed by chemiosmosis that produce ATP.

• Photophosphorylation uses the radiant energy of the sun for the synthesis of ATP.

136. Oxidation of $NADH_2$ and $FADH_2$ takes place during ETS, which is associated with:

(a) matrix (b) Cytoplasm

(c) Stroma (d) Cristae

MHT CET-2019

Ans. (d) : Oxidation of $NADH_2$ and $FADH_2$ takes place during ETS, which is associated with cristae.

• The inner mitochondrial membrane contain group of electron and proton acceptors. Each of these groups are arranged in specific sequence that form electron transport chain on electron transport system (ETS).

137. Co-enzymes of Electron Transport Chain in mitochondria are____.

(a) Cytochromes,dehydrogenases, flavoproteins

(b) Cytochromes, catalases, peroxidases

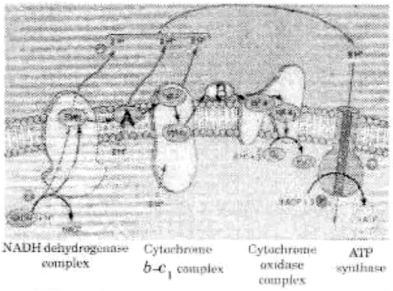
(c) Hyaluronidases, dehydrogenases, hydrolases

(d) Flavoproteins, anhydrases, phosphatases

MHT CET-2018

Ans. (a) : Co-enzymes of Electron Transport Chain in mitochondria are cytochromes,dehydrogenases, flavoproteins.

138. The following is a scheme showing the electron transport system. Identify the electron carrier molecules indicates as A and B Choose the correct option.



(a) A = Cytochrome C, B = Coenzyme Q

(b) A = Coenzyme Q, B = Cytochrome C

(c) A = FMN, B = Fe-S protein

(d) A = Fe-S protein B = FMN

Karnataka CET-2010

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Ans. (b) : Electron transport system is a series of protein complex and other molecule in inner mitochondrial membrane that transfer electron from electron donor to electron acceptor. Coenzyme Q (shown by A) is a lipid–soluble benzoquinone that serves as an electron carrier and transfers the electrons to cytochrome bc_1 of complex III. Cytochrome C (shown by B) is a soluble protein that accepts an electron from complex III and donates them to the binuclear copper center of complex IV.

139. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP?
(a) Conversion of pytuvic acid in acetyl Co-A
(b) Electron transport chain
(c) Glycolysis
(d) Krebs cycle

JIPMER-2007

Ans. (b) : The electron transport chain is a series of four protein complexes that couple redox reactions, creating an electrochemical gradient that forms ATP in a complete system named oxidative phosphorylation.
Hence, during this stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP.

140. The name of process of aerobic respiration, in which energy is provided in steps in electron transport chain, is:
(a) EMP-pathway
(b) decarboxylation
(c) photophosphorylation
(d) oxidative phosphorylation

WB JEE-2006

Ans. (d) : The name of process of aerobic respiration, in which energy is provided in steps in electron transport chain, is oxidative phosphorylation.

141. Phytochrome occurs in two forms. In which form it promotes the germination of seeds of some species ?
(a) P_{fr} forms (b) P_r forms
(c) Both (a) and (b) (d) None of these

UP CPMT-2004

Ans. (a) : The form of phytochrome that promotes germination is P_{fr} . P_{fr} is the active form of phytochrome , and it is produced when seeds are exposed to red light . P_{fr} then binds to proteins in the cell, which triggers a series of events that lead to germination.
• Phytochrome is a pigment. It is a protein that absorbs light in the red and far red region of the visible spectrum.

142. Photophosphorylation was discovered by:
(a) Hill (b) Arnon
(c) Jolly (d) Dixon

Punjab MET-1999

Ans. (b) : Photophosphorylation was discovered by Dr.Daniel Arnon and his colleagues. It is the process of utilizing light energy from photosynthesis to convert ADP to ATP. Arnon found this in vitro in isolated chloroplast by using P^{32}.

143. The ATP production in photosynthesis is called:
(a) phototropism (b) phosphorylation
(c) photooxidation (d) photophosphorylation

Uttarakhand PMT-2007

Ans. (d) : The ATP production in photosynthesis is called photophosphorylation. During the light reaction of photosynthesis, phosphorylation occurs, where in inorganic phosphate is added to ADP and results in the formation of ATP since this process utilizes light energy. It is known photophosphorylation.

144. In Electron Transport system (ETS), which of the following cytochrome reacts with oxygen?
(a) Cyt – a_3 (b) Cyt – *f*
(c) Cyt – b (d) Cyt – b_6

VMMC-2013

Ans. (a) : In electron transport system (ETS) chytochrome a_3 reacts with oxygen.
• Cyto a_3 also contains copper elements
• Cyto b_6 is the mitochondrial protein which functions as part of electron transport chain

145. Which of the following stains is used for determination of cytochrome oxidase activity in the cell?
(a) Eosin (b) Neutral red
(c) Janus green B (d) Methylene blue

Manipal-2011

Ans. (c) : Janus green B stains is used for determination of cytochrome oxidase activity in the cell. Janus green B is used in change in colour based on the presence of reduced cytochrome c oxidase indicating its activity.
• Janus green – B selectively stains mitochondria

146. Non-cyclic photophosphorylation results in the production of :
(a) ADP (b) ATP
(c) NADPH (d) ATP and NADPH

J&K CET-2012

Ans. (d) : Non-cyclic photophosphorylation results in the production of ATP and NADPH. Oxygen is produced as a waste product of photosynthesis.

147. Which of the following vitamins is used in electron transport system ?
(a) Calciferol (b) Thiamine
(c) Riboflavin (d) Ascorbic acid

AMU -2000

Ans. (c) : Riboflavin (vitamin-B2) is used in electron transport system. It plays an important role by acting as a component of the electron carriers in the form of flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN). These carriers help transport electrons during the process of generating energy from molecules.

148. Ferredoxin is found in:
(a) PS - I (b) PS - II
(c) Hill reaction (d) P_{680}

CG PMT-2006

Ans. (a) : Ferredoxin is found in PS - I
Reaction center of pigment system - II is P_{680} nm.
Reaction center of photo system - I (PS - I) is P_{700}.
Hill reaction is the portion of the light reaction in which electrons from water are transferred to an electron acceptor that reduce reducing the acceptor.

149. Inner mitochondrial membrane possesses enzyme:
(a) ATP - synthetase, succinate dehydrogenase and respiratory chain enzymes
(b) NADH - cytochrome reduclase and monomeric oxidase

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(c) Malale and isocitrate dehydrogenases fumarate aconitase and citrate symheiaa
(d) Adenyrate kinase and nucleoside diphosphokinase

CMC Ludhiana-2007

Ans. (a) : The mitochondria is a double membrane cell organelle, that is also called as the power house of the cell. The inner membrane of the mitochondria is the site of the electron transport chain (aerobic respiration).
The inner membrane of the mitochondria membrane help in the synthesis of ATP molecule, succinate dehydrogenase is a part of respiratory complex – II that is responsible for the converting succinate to fumarate in the citric acid cycle or Kreb's cycle.
Thus, the inner membrane of mitochondria possesses enzyme ATP synthetase, succinate dehydrogenase and respiratory chain enzymes.

150. What is common in photosynthesis and respiration?
(a) Light energy (b) $NADPH_2$
(c) Cytochromes (d) $NADH_4$

CMC Ludhiana-2008

Ans. (c) : Cytochrome is common in photosynthesis and respiration.
It takes part in redox reaction and electron transport.
Redox reaction- It is an active protein that is known as cytochrome which contain Fe atom.

151. The carrier which transfer the electrons in electron transport system:
(a) Phytochrome (b) Cytochrome
(c) Quantasomes (d) Fucoxanthin

CMC Ludhiana-2008

Ans. (b) : The carrier which transfer the electrons in electron transport system is cytochrome. It transfers the electrons in electron transport system.
Phytochrome are blue - green, proteinaceous pigment, phytochrome pfr promotes germination of seeds.
Fucoxanthin is a xanthophylls with the chemical formula $C_{42}H_{58}O_6$. It is an accessory pigment in the chloroplast of brown seaweeds.

152. Which one of the following is complex V of the ETS of inner mitochondrial membrane?
(a) NADH dehydrogenase
(b) Cytochrome c oxidase
(c) Ubiquinone
(d) Succinate dehydrogenase
(e) ATP synthase

Kerala PMT-2009

Ans. (e) : Complex V is ATP synthase complex that comprise of head piece, stalk and a base piece. It is also called as F_o-F_1 or elementally particles.
- F_1 is a peripheral membrane protein complex that contains catalytic site for converting ADP and P_i to ATP. It is necessary for binding F_1 to the inner mitochondrial membrane.
- F_o is an integral membrane protein complex consisting of 3 different polypeptides, form the channel for flow of electrons to F_1.

153. The correct sequence of electron acceptor in ATP synthesis is:
(a) Cyt. b, c, a_3, a (b) Cyt. c, b, a, a_3
(c) Cyt. a, a, b, c (d) Cyt. b, c, a, a_3,

AIPMT-1997

Ans. (d) : The electron are transported from NAD^+ to Flavoprotein and then to cytochrome Q. From Cytochrome Q electron are transfer to Cyt b, Cyt c, Cyt a and Cyt a_3.

154. Phosphorylation in respiration is known as:
(a) Oxidative phosphorylation
(b) Photophosphorylation
(c) Reductive photophosphorylation
(d) Oxidative phosphorylation

MHT CET-2006

Ans. (a) : Phosphorylation in respiration is known as oxidative phosphorylation. It is the synthesis of energy rich ATP molecules with the help of energy liberated during oxidation of reduced co-enzymes (NADH, $FADH_2$) formed in respiration.

155. In the electron transport system present in the inner mitochondrial membrane, complexes I and IV are respectively:
(a) NADH dehydrogenase and $FADH_2$
(b) $FADH_2$ and NADH dehydrogenase
(c) NADH dehydrogenase and cytochrome oxidase complex
(d) NADH dehydrogenase and ATP synthase
(e) Cytochrome complex and NADH dehydrogenase

Kerala PMT-2011

Ans. (c) : Complex I of electron transport chain (ETS) is NADH dehydrogenase that oxidizes NADH formed in mitochondrial matrix at the time of citric acid cycle. Complex IV of ETS refers to cytochrome oxidase complex that contain cytochrome a and a_3 and two copper centre.

156. Match the following electron transport chain (ETC) inhibitors with their mode of action.

	Column - I		Column – II
A.	Dinitrophenol (2.4-DNP)	1.	Electro flow from cyt - a_3 to O_2
B.	Cyanide	2.	Direct electrons from Co-Q to O_2
C.	Antimycin -A	3.	Electron flow from NADH/ FADH a to Co-Q
D.	Rotenone	4.	Electron flow from Cyt-b to Cyt-c

Codes
(a) A-2 B-4 C-1 D-3 (b) A-2 B-1 C-4 D-3
(c) A-3 B-4 C-1 D-2 (d) A-4 B-3 C-2 D-1

MGIMS Wardha-2015

Ans. (a) :

	Column-I		Column–II
(A)	Dinitrophenol (2.4-DNP)	(2)	Direct electrons from Co-Q to O_2
(B)	Cyanide	(4)	Electron flow from Cyt-b to Cyt-c
(C)	Antimycin - A	(1)	Electro flow from cyt - a_3 to O_2
(D)	Rotenone	(1)	Electron flow from NADH/FADH a to Co-Q

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G. The Respiratory Balance Sheet

157. Respiratory substrate fielding maximum number of ATP molecules is:
(a) ketogenic amino acid (b) glucose
(c) amylase (d) glycogen
CG PMT-2011

Ans. (b) : Respiratory substrate that give maximum number of ATP molecules is glucose.
One glucose molecules on aerobic respiration gives 36 ATP molecules.

158. Arrange the following compounds formed in respiration based on their C-atoms in ascending order
(I) Pyruvic acid (II) α-ketoglutaric acid
(III) Citric acid (IV) Malic acid
Identify correct answer:
(a) IV, I, II, III (b) I, IV, II, III
(c) I, II, IV, III (d) I, IV, III, II
AP EAMCET-2016

Ans. (b) : • Pyruvic acid is a 3-carbon compound with empirical formula $C_3H_4O_3$.
• α – ketoglutaric acid is 5-carbon compound with empirical formual $C_5H_6O_5$.
• Citric acid is a 6-carbon compound with empirical formula $C_6H_8O_7$.
• Malic acid is 4-carbon compound with empirical formula $C_4H_4O_4$
So, the ascending order of these molecules on the basis of a number of carbon atoms will be
Pyruvic acid < Malic acid < α-Ketoglutararic acid < Citric acid.

H. Amphibolic pathway

159. How many ATP molecules are synthesized in complete aerobic respiration of dipeptide molecule during Amphibolic pathway?
(a) 30 ATP (b) 60 ATP
(c) 15 ATP (d) 36 ATP
GUJCET-2017

Ans. (a) : Total 30 ATP molecules are synthesized in complete aerobic respiration of dipeptide molecule during amphibolic pathway.

160. During anaerobic respiration in yeast :
(a) H_2O and CO_2 are end products
(b) CO_2, ethanol and energy are end products
(c) CO_2, and H_2O are end products
(d) CO_2, acetic acid and energy are end products
Haryana PMT-2004

Ans. (b) : Anaerobic respiration occurs in the absence of oxygen and involves the partial oxidation of glucose molecules.
The number of ATP molecules obtained through anaerobic respiration is lower than aerobic respiration
In yeast, the end product of anaerobic respiration is ethyl alcohol, CO_2 and ATP.

161. The process of deriving glucose from fats and proteins is called:
(a) glycogenolysis (b) gluconeogenesis
(c) glycogenesis (d) glycolysis
CG PMT-2011

Ans. (b) : The process of obtaining glucose from fats and proteins is called gluconeogenesis.
Gluconeogenesis occurs in the liver cells and maintain blood glucose level during a fast.

162. Which of the two statements together supports that respiratory pathway is an 'amphibolic pathway' ?
(I) Fats breakdown to glycerol and fatty acids subsequently yields acetyle co-enzyme 'A'
(II) In respiration, C-C bonds of complex compounds breakdown through oxidation leading to release of energy
(III) Acetyl coenzyme 'A' from the respiratory pathway is withdrawn for the synthesis of fatty acids .
(IV) Proteins are degraded by protease to amino acids and enter the respiratory pathway.
(a) (I, II) (b) (I, IV)
(c) (II, IV) (d) (II, III)
TS EAMCET-2015

Ans. (d) : In respiration, glucose is first broken down into pyruvate in the cytoplasm and then giving out energy, this makes it a catabolic process.
• The intermediates formed during the breakdown of biomolecules, are utilized to synthesize biomolecules such as proteins, fatty acids, etc. This makes it an anabolic process.

I. Respiratory quotient

163. When the organic acid is oxidised in respiration, the value of R.Q. becomes:
(a) zero (b) one
(c) less than one (d) more than one
MGIMS Wardha-2013 / CG PMT-2005
Rajasthan PMT-1997, 1995

Ans. (d) : When an organic acid is oxidized the value of R.Q. in respiration becomes more than one because organic acid are rich in O_2 and need less O_2 for their oxidation. It is clear from the equation given below,

$$\underset{(\text{malic acid})}{C_4H_6O_5} + 3O_2 \rightarrow 4CO_2 + 3H_2O$$

$$\because \quad \text{R.Q.} = \frac{\text{Volume of } CO_2 \text{ evolved}}{\text{Volume of } O_2 \text{ taken}} = \frac{4}{3}$$

R.Q. = 1.3(More than one)

164. R.Q. is always less than one in:
(a) wheat (b) millets
(c) bean (d) castor
BHU PMT (Mains)-2009 / Haryana PMT-2005
BHU PMT-2003 / HP CET-2012 / VMMC-2004

Ans. (d) : R.Q is always less than one in castor.
Groundnut and castor seeds are fats storing seeds and the stored fats are mobilized during their seed germination.
Therefore, the RQ value is less than one for germinating groundnut and castor seed.
When fats are used in respiration, the R.Q. will be less than one.

@apna_pdf

165. In a germinating seed when protein is aerobically oxidized, the R.Q. value will be:

(a) More than one (b) Less than one
(c) One (d) Zero

BHU PMT (Screening)-2011 / Karnataka CET-2003 DUMET-2001 / AMU-2001 / AP EAMCET-2000

Ans. (b) : $R.Q = \frac{CO_2 \text{ eliminated}}{O_2 \text{ consumed}}$

Respiratory quotient of different compounds have different volumes such as R.Q of protein is around 0.8. Whenever the substrate is protein the R.Q value will be always less than one and in case of a germinating seed protein is aerobically oxidized, then respiratory quotient value will be less than 1.

166. Find out the correct match

	Set-I		Set-II
A.	Tidal Volume	i.	3000 – 3500 ml
B.	Insipratory Reserve Volume	ii.	1000 – 1100 ml
C.	Expiratory Reserve Volume	iii.	500 ml
D.	Inspiratory Capacity	iv.	2500 – 3500 ml

(a) A-iii, B-i, C-iv, D-i
(b) A-ii, B-iii, C-i, D-iv
(c) A-iii, B-iv, C-i, D-ii
(d) A-iii, B-iv, C-ii, D-i

AP EAPCET-23.05.2023, Shift-II

Ans. (d) : j

	Set-I		Set-II
A	Tidal volume	(iii)	500 ml
B	Insipratory Reserve volume	(iv)	2500–3500 ml
C	Expiratory Reserve volume	(ii)	1000 – 1100 ml
D	Inspiratory capacity	(iv)	3000 – 3500 ml

167. Considering following chemical equation, guess what could be the nature of respiratory substrate ?

$2(C_{51}H_{98}O_6)+145O_2 \rightarrow 102CO_2+98H_2O+Energy$

(a) Carbohydrate as well as protein
(b) Fat
(c) Protein
(d) Carbohydrate

MHT CET-06.10.2020 Shift-I

Ans.(b):

$2C_{51}H_{98}O_6+145O_2 \rightarrow 102CO_2+98H_2O+Energy$

$$R.Q = \frac{102CO_2}{145O_2} = 0.7$$

168. When tripalmitin is used as respiratory substrate in aerobic respiration, the process consumes 145 molecules of Oxygen and releases 102 molecules of CO_2, then RQ value would be:

(a) 0.7 (b) 1.0
(c) 0.5 (d) 1.4

Karnataka CET-2019

Ans. (a) : Tripalmitin is a fatty acids and for the fats respiratory quotient is always less than one as consumption of oxygen is more. If 145 molecules of O_2 is consumed and 102 molecules of CO_2 are evolved. The RQ value would be 0.7.

169. RQ of malic acid is:

(a) 1.9 (b) 1.49
(c) 1.33 (d) 1

JIPMER-2018

Ans. (c) : R.Q. of malic acid is 1.33

$$\underset{\text{(Malic acid)}}{C_4H_6O_5} + 3O_2 \rightarrow 4CO_2 + 3H_2O$$

$$R.Q = \frac{4 \text{ mol of } CO_2 \text{ produced}}{3 \text{ mol of } O_2 \text{ consumed}} = 1.33$$

170. Respiratory Quotient (RQ) is less than one when the substrate is :

(a) Protein (b) Carbohydrate
(c) Organic acid (d) None of these

VMMC-2011

Ans. (a) : Respiratory Quotient (RQ) is the ratio of the amount of CO_2 released to the amount of O_2 consumed.

$$R.Q = \frac{\text{amount of } CO_2 \text{ realsed}}{\text{amount of } O_2 \text{ consumed}}$$

When the respiratory substance is fat or protein then the RQ is usually less than one because the volume of carbon dioxide evolved and oxygen observed is not equal.

- Carbohydrate respiratory quotient is 1.
- When organic acid are as a respiratory substance their RQ is greater than one.

171. Respiratory quotient of carbohydrate is :

(a) unity (b) greater than unity
(c) less than unity (d) equal to five

CMC Ludhiana -2013 / BCECE-2005

Ans. (a) : Respiratory Quotient (RQ) is the ratio of volume of CO_2 produced to volume of O_2 consumed.

- RQ of carbohydrate is 1 (unity)

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + ATP$$

$$RQ = \frac{6CO_2}{6O_2} = 1$$

When, carbohydrate are used as substarate and are completely oxidised, the RQ will be 1.

172. The RQ of $C_{39}H_{72}O_6$ is:

(a) 2.71 (b) 1.34
(c) 0.718 (d) 3.250

Manipal-2011

Ans. (c) : $R.Q. = \frac{\text{Volume of } CO_2 \text{ produced}}{\text{Volume of } O_2 \text{ consumed}}$

$$C_{39(Fat)}H_{72}O_6 + 54O_2 \rightarrow 39CO_2 + 36H_2O$$

$$RQ = \frac{39CO_2}{54O_2} = 0.72$$

173. Respiratory Quotient (R.Q.) is defined as :

(a) vol. of O_2/vol. of CO_2
(b) vol. of CO_2/vol. of O_2
(c) vol. of O_2/vol. of N_2
(d) vol. of N_2/vol. of CO_2

AMU-2005 / Uttarakhand PMT-2004 / Manipal-2004

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Ans. (b) : Respiratory quotient (R.Q) is the ratio of the volume of CO_2 gives out and the volume of O_2 taken in respiration.

$$R.Q = \frac{\text{Volume of } CO_2}{\text{Volume of } O_2}$$

174. R.Q. of sprouting potato tubers will be:

(a) 1 (b) < 1
(c) >1 (d) 0

Karnataka CET-2002

Ans. (a) : R.Q. of sprouting potato tubers will be 1

175. Respiratory quotient of mixed diet is:

(a) 0.25 (b) 0.85
(c) 0.7 (d) 1.5

Haryana PMT-2002

Ans. (b) : The approximate respiratory quotient of a mixed diet is 0.8.
Some of the other factor that may affect the R.Q are energy balance, circulating insulin and insulin sensitivity.

176. RQ of succulents is:

(a) 1 (b) 4
(c) 0 (d) ∞

CG PMT-2006

Ans. (c) : In succulent plants, at night stomata are open and CO_2 is fixed into organic acid therefore, at night there is no net CO_2 evolved.
Hence, value of R.Q. is zero.

177. The respiratory quotient during cellular respiration would depend on:

(a) the nature of enzymes involved
(b) the nature of the substrate
(c) the amount of carbon dioxide released
(d) the amount of oxygen utilized

Karnataka CET-2009
Manipal-2009
JIPMER-2014

Ans. (b) : The respiratory quotient during cellular respiration would depend on the nature of the substrate.

178. More CO_2 is evolved than the volume of oxygen consumed when the respiratory substrate is:

(a) fat (b) sucrose
(c) glucose (d) organic acid

Haryana PMT-2003

Ans. (d) : More CO_2 is evolved than the volume of oxygen consumed when the respiratory substrate is organic acid. The organic acid consume less oxygen due to its adequate presence and give R.Q. more than one.

$$2(COOH)_6 + O_2 \rightarrow 4CO_2 + 2H_2O$$

$$RQ = \frac{4CO_2}{1O_2} = 4 \text{ is for oxalic acid.}$$

179. Respiratory quotient of oxalic acid is:

(a) 1.5 (b) 1.0
(c) 4 (d) 0.7

BVP-2013

Ans. (c) : The organic acid (oxalic acid) consume less oxygen due to its adequate presence and gives R.Q. more than one.

$$2(COOH)_6 + O_2 \rightarrow 4CO_2 + 2H_2O$$

$$RQ = \frac{4CO_2}{1O_2} = 4$$

So, the R.Q. of oxalic acid is 4

180. RQ value of 4 may be expected for the complete oxidation of which one of the following?

(a) Glucose (b) Malic acid
(c) Oxalic acid (d) Tartaric acid

Kerala PMT-2009
Punjab MET-2007

Ans. (c) : The oxalic acid consume less oxygen and release more carbon dioxide, so that R.Q is more than one.

$$2C_2H_2O_4 + O_2 \rightarrow 4CO_2 + 2H_2O$$

$$R.Q = \frac{CO_2}{O_2} = \frac{4}{1} = 4$$

- When carbohydrates are the respiratory substrate:–
  The value of R.Q. = 1.0
- When organic acid are respiratory substrate:
  Then value of R.Q. is < 1 (more than 1.)
- When lipid or fats and proteins are respiratory substrate, R.Q. Value will be less than one . It is because lipids are poor in O_2 for their oxidation.

181. Which one has the lowest respiratory quotient?

(a) Glucose (b) Tripalmitin
(c) Oxalic acid (d) Malic acid

BCECE-2015

Ans. (b) : Respiratory quotient is the ratio of the volume of CO_2 released and O_2 consumed in respiration.

- The respiratory quotient (RQ) depends upon the type of respiratory substrate used during respiration.

It is less than 1 for fat. If tripalmitin is the respiratory substrate the ratio would be about 0.7 2

$$\underset{\text{(Tripalmitin)}}{(C_{51}H_{98}O_6)} + 145O_2 \rightarrow 10CO_2 + 98H_2O \text{ Energy}$$

- R.Q. value is greater than unity (1) as in organic acid O_2 consumption is less than CO_2 release more.

182. The Respiratory Quotient (RQ) of glucose is:

(a) 0.5 (b) 0.7
(c) 1.0 (d) 1.5

WB JEE-2014

Ans. (c) : R.Q. is defined as ratio of volume of CO_2 released to O_2 consumed in respiration.

$$RQ = \frac{\text{Vol. of } CO_2}{\text{Vol. of } O_2}$$

When carbohydrates (glucose) are the respiratory substrate:–
Then value of R.Q. = 1 (unity)

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + E$$

$$RQ = \frac{6}{6} = 1$$

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15 PLANT GROWTH AND DEVELOPMENT

A. Plants Growth

1. The deteriorative processes in plants, that naturally terminate their functional life, are collectively called

(a) wilting (b) abscission
(c) plasmolysis (d) senescence

UP CPMT-2009 / Rajasthan PMT-2009 / BVP-2006 AMU-2005 / Manipal-2004 / Uttarakhand PMT-2004

Ans. (d) : The deteriorative process in plants, that naturally terminate their functional life, collectively called senescence. Senescence as an active development cellular process in the growth and functioning of a flowering plants, is indicated in leaf as abscission.

Wilting- When plant-roots are unable to supply sufficient moisture to the stems and leaves, then plant wilt condition.

Abscission- It is the shedding of various parts of an organism.

Plasmolysis –Plasmolysis is defined as the process of contraction or shrinkage of the protoplasm of a plant cell and is caused due to the loss of water in the cell.

2. Humus is essential for plant growth because

(a) it is rich in nutrients and increases the water holding capacity of soil
(b) it increases aeration of soil
(c) it increases porosity of soil
(d) All of above

HP CET-2011 / BCECE-2006 / VMMC-2005 AMU-2004 / BVP-2003

Ans. (d) : Humus is essential for plant growth because it is rich in nutrients and increases the water holding capacity of soil , increases aeration of soil and increases porosity of soil also.

3. The maximum growth rate occurs in

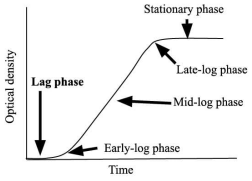
(a) stationary phase (b) senescent phase
(c) lag phase (d) exponential phase

CMC Ludhiana-2012, 2009 / JCECE-2009 Manipal-2007 / CG PMT-2006 / AIPMT-2004

Ans. (d) : The maximum growth rate occurs in exponential phase. It is characterized by rapid growth in population of tree.

In microbial growth curve, lag initial phase is characterized by cellular activity but not growth.

- Exponential or log phase is the time when cells are dividing by binary fission and doubling in number after each generation time.
- In stationary phase, the growth curve begins to destine as the available nutrients become depleted and waste products start to accumulate.
- The terminal irreversible stage of ageing is called senescence this is the last phase of life span that ultimately leads to death.



4. Which of the following statements is not correct?

(a) Plant growth is generally determinate.
(b) Plant growth is measurable.
(c) Phase of cell elongation of plant cells is characterized by increased vacuolation.
(d) Cells in the meristematic phase of growth exhibit abundant plasmodesmatal connections.

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (a) : Plant growth is indeterminate i.e. plants retain the capacity for unlimited growth throughout their life.

- The growth of reproductive organs is limited which is called determinate growth.

5. Growth can be measured by:

(a) Auxanometer (b) Horizontal microscope
(c) Crescograph (d) All of these

SRM JEEE -2019, 2017 UPCPMT-2002

Ans. (d) : Auxanometer – It is used to measure the growth in length of a plant organ.

Horizontal microscope – A horizontal microscope which slides vertical scale is used for measurement of plant growth.

Crescograph – It is a device that is used to measure the growth of plants.

6. Assertion (A) : Measurement and comparison of the total plant growth per unit time is not absolute growth rate.

Reason (R) : The growth of given system per unit time as percentage of initial size is called the relative growth rate

What of the following is true?

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A)

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(c) (A) is true, but (R) is false
(d) (A) is false, but (R) is true

TS EAMCET-02.05.2018 Shift-II

Ans. (d) : Increase in total growth of two organs or organisms is measured and comparison of total growth per unit time is called absolute growth rate.
Relative growth rate a measurement of the production of a plant defined as the increase in dry mass per unit of plant. The growth of the given system per unit time expressed on a common basis per unit initial parameter is called relative growth rate.
Hence, (A) is false but (R) is true.

7. Two seeds are germinated, A in light and B in dark. Which grows taller in initial stage?
(a) A > B (b) B > A
(c) A = B (d) No growth in either case

CG PMT-2011

Ans. (a) : When two seeds germinated in different situation, A in light and B in dark then, it is clear that A grows taller in initial stage, because of the auxin is more active in light.
Auxin is a plant hormone which induce cell division, elongation and differentiation, apical dominance, root and stem tropism and in embryonic development.

8. Excess amount of CO_2
(a) retards growth
(b) accelerates growth
(c) affects growth shortly
(d) does not effect growth

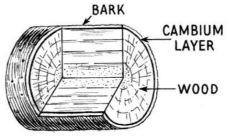
CG PMT-2011

Ans. (a) : Excess amount of CO_2 retards growth. The concentration of CO_2 in the atmosphere today hovers around 410 parts per million. Maximum CO_2 level cause plants to thickness their leaves that could worsen climate change effects. Due to excess of CO_2 trees that grow quickly die younger.

9. The growth in diameter of stem is due to :
(a) cambium (b) xylem
(c) Phloem (d) shoot apex

Rajasthan PMT-2000

Ans. (a) : The growth in diameter of stem is due to cambium. Growth of plants depends on two of growth namely primary growth and secondary growth. Primary growth means increase in length of stem and root and secondary growth means increase in thickness.
Xylem- It acts as main water conducting tissue. It provides mineral and nutrition to plant parts.
Phloem- It works as a main food conducting tissue. It also provides mineral and nutrition to plant parts.
Shoot apex:- It is the apical part of the stem.



'Cambium'

10. The maximum growth of plants occurs during?
(a) summer (b) winter
(c) autumn (d) spring

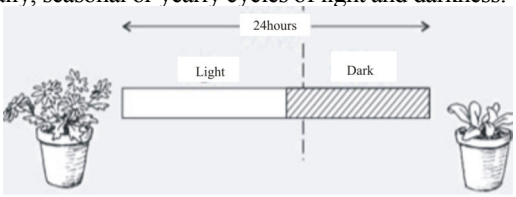
Rajasthan PMT-2000

Ans. (d) : The maximum growth of plants occurs during springseason. In this season the temperature starts increasing and moisture level also increased. We know that plant growth depends upon water, light, warmth and soil or compost. So, spring season is beneficial for all condition.

11. A physiological response to the duration of light and darkness is a
(a) daily phase cycle (b) circadian rhythm
(c) biological clock (d) photoperiodism

AMU-2001

Ans. (d) : A physiological response to the duration of light and darkness is a photoperiodism. It is the ability of plants and animals to measure environmental day length. Photoperiodism response of organism to change of duration in daily, seasonal or yearly cycles of light and darkness.



12. Phototropic curvature in Avena coleoptile is the result of uneven distribution of
(a) auxin (b) starch
(c) gibberellins (d) phytochrome

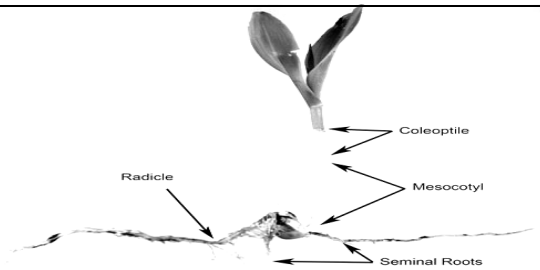
MGIMS Wardha-2013

Ans. (a) : Phototropic curvature in Avena coleoptile is the result of uneven distribution of auxin. Auxin is a plant hormone which is responsible for cell multiplication and photoactive movement so, Auxin can effect phototropic curvature.
Gibberllins- It is a group of plant hormones that collect elongation of the stem, flowering and germination.
Phytochrome- It is used to detect light. It is sensitive to light in the red and far-red region of the visible spectrum.
Starch:- Starch is the major reserve food material found inside the plants.

13. Which part of embryo comes out first during seed germination?
(a) Radicle (b) Plumule
(c) Hypocotyl (d) Epicotyl

BVP-2010, 2014

Ans. (a) : Radicle part of embryo comes out first during seed germination. Embryo is a miniature version of the plants.



Plumule- It helps in developing the shoot system, which includes the stem, leaves, flowers and fruits.
Hypocotyl- It is a part of plant seeding that lies between the radicle and the cotyledons.
Epicotyl–It is a region of the stem of embryo plant found beneath the stalk of leaves directly above the root.

14. Maximum amount of growth in root occurs
(a) In the absence of light
(b) At its apex
(c) Behind the apex
(d) In the presence of soil

BCECE-2011

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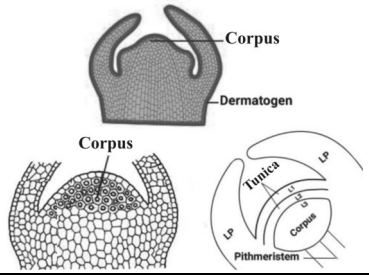
Ans. (c) : Maximum amount of growth in root occurs behind the apex. Apex part of root is made up of protective tissue.

15. Tunica corpus theory is used for
(a) shoot apex (b) root apex
(c) leaf apex (d) both [a] and [b]

Uttarakhand PMT-2007

Ans. (a) : Tunica corpus theory is used for shoot apex. This theory is given by Schmidt in 1924. According to the theory, the apical region of the shoot system is categorized. Tunica is the outer covering made up of small cells. Corpus is the inner mass of the cells forming the inner core.



16. In germinating seeds, fatty acids are degraded exclusively in the
(a) proplastids (b) glyoxysomes
(c) peroxisomes (d) mitochondria

BHU PMT (Screening)-2010

Ans. (b) : In germinating seeds, fatty acids are degraded exclusively in the glyoxysomes. Glyoxysomes are small spherical vesicles enclosed by a single unit membrane. Glyoxysomes happen only in fat-rich plant cells, where they take part in β-oxidation of fats and perform the glyoxylate cycle.
Proplastids- They are a pigment. They contain double membrane-bound organelle.
Peroxisomes- They are small in size and their membrane is enclosed that contain enzyme involve in different metabolic reaction.
Mitochondria – Mitochondria are membrane bound cell organelles that generate most of the chemical energy needed to power the cell's biochemical reaction.

17. Senescence as an active developmental cellular process in the growth and functioning of a flowering plants, is indicated in
(a) vessels and tracheid differentiation
(b) leaf abscission
(c) annual plants
(d) floral parts

Rajasthan PMT-2010

Ans. (b) : Senescence as an active development cellular process in the growth and functioning of a flowering plants, is indicated in leaf abscission. Senescence is a metabolic process, therefore it requires energy. It is not simply the ending of growth. Leaves, for example, move the product of photosynthesis- and their own structural substances out of leaf tissue into stem and root tissue during senescence and before their vascular connections are served at abscissions.

18. At which stage the enzymatic actions start in plant?
(a) Germination
(b) At the time of photosynthesis
(c) At the time of flower establishment
(d) At the time of fertilization

AMU-2011

Ans. (a) : At germination stage the enzymatic actions starts in plant. Any enzymatic action that participates in purging DNA of damaged elements and returns it to its canonical form.

19. Plant response to environment is mainly through
(a) induction of dormancy
(b) abscission of parts
(c) synthesis of pigments
(d) growth

CG PMT-2007

Ans. (d) : Plant response to environment is mainly through growth. The response of an organism, usually, a plant, to an environmental stimulus is called a tropism. Some plant stimuli include light, gravity, water, movement of the sun, and touch. The naming of the tropism is associated with the stimulus.

20. Growth is an irreversible process seen at all organizational levels. It consists of
(a) organ growth (b) subcellular growth
(c) cell growth (d) All of the above

CG PMT-2007

Ans. (d) : Growth is an irreversible process seen at all organizational level. It consists of organ growth, subcellular growth and cell growth. It occurs by a rise in cell size or number. In animal, growth rate is observed upto a certain period of time.
Whereas plants show continuous growth throughout the lifetime. Growth is the most fundamental characteristic of living organism and various metabolic process that happen at the value of energy.

21. Substances synthesized during growth are
(a) protoplasmic (b) apoplasmic
(c) both (a) and (b) (d) nucleic acid

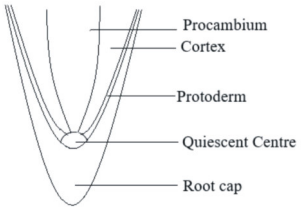
CG PMT-2007

Ans. (c) : Substances synthesized during growth are protoplasmic and apoplasmic. Protoplasmic is a living part of a cell that is covered by a plasma membrane. Protoplasm is mixture of small molecules such as ions, amino acid etc. Apoplasmic are non-living material. They are formed by the cell which become component of tissues.

22. Quiescent center occurs in
(a) at the tip of root apex
(b) at shoot apex
(c) just below the tip of root apex
(d) just below the tip of shoot apex

VMMC-2014

Ans. (a) : Quiescent center occurs at the tip of root apex. It is basically found in the root behind a region of meristematic activity and cell. Quiescent acts a strong resistance towards ionising radiation.



23. Plant growth is:
(a) limited (b) unlimited
(c) diffused (d) irretic

Uttarakhand-2005

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Ans. (b) : Plant growth is unlimited. Plant growth can be understand as the increasing of plant mass or volume without formation (with formation) of new structures such as cells, tissues or cell organelles. Primary growth in the plant is a result of rapidly dividing cell.

24. A few normal seedlings of tomato were kept in a dark room. After a few days they were found to have become white-coloured like albinos. Which of the following terms will you use to describe them?

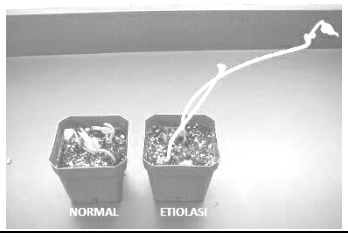
(a) Mutated (b) Embolised
(c) Etiolated (d) Defoliated

AIPMT-2014

Ans. (c) : Etiolation involved prolonged growth in the absence of light.

Etiolation is a process in which flowering plants are grown in the partial or complete absence of light. Etiolation is mainly characterised by the long and weak stem and smaller, sparse pale yellow colour (chlorosis) leaves due to longer internodes. Etiolation is performed by phytohormones such as auxin, gibberellins

Hence, the tomato seedlings when kept in the darkroom were found to become white coloured like albinos.



25. Which one increases in the absence of light?

(a) Uptake of minerals
(b) Uptake of water
(c) Elongation of internodes
(d) Ascent of sap

AIPMT-1989

Ans. (c) : In general intense light retards growth in plants. High light intensities induce dwarfening of the plant. In the absence of light stem becomes excessive long due to 'etiolation'. This causes cells of internodes to get enlarged.

26. If the shoot apex of any young plant growing in a pot, is cut off, which of the following events are more feasible to occur?

(a) the remaining upper leaves will increase in area
(b) the axillary buds in the remaining upper leaves will grow faster
(c) Regeneration of apical bud will occur
(d) The plant dies

AP EAMCET-1998

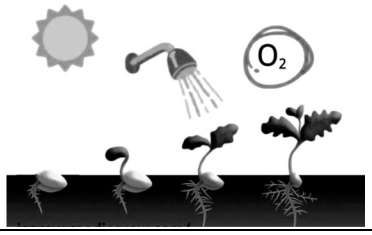
Ans. (b) : When we cut the shoot apex the axillary buds are developed and grow more rapidly. This method is used to obtain tall and bushy plants. Removal of shoot apex is called as topping and growing of axillary buds called is suckering.

27. Necessary conditions for seed germination is

(a) light and O_2
(b) light and high temperature
(c) vernalization and scarification
(d) water and O_2

UP CPMT-2005

Ans. (d) : Water, oxygen, and proper temperature are essential conditions for seed germination. Some seeds require proper light also. Some germinate better in full light while other requires darkness to germinate. When a seed is exposed to the proper conditions, water and oxygen are taken in through the seed coat.



28. Opening of floral buds into flowers, is a type of:

(a) Autonomic movement of growth
(b) Autonomic movement of locomotion
(c) Autonomic movement of variation
(d) Paratonic movement of growth

AIPMT-2007

Ans. (a) : Opening of floral buds into flowers, is a type of autonomic movement of growth.

Movement may be of two types, movement of locomotion and movement of curvature.

- Opening of floral buds into flowers is such a type of growth movement.
- Movement of curvature is movement of individual parts in relation to other parts.
- Curvature movement may be growth movement and turgor movements.
- Growth movements are caused by differential growth in different part of an organ.
- Inner surface or upper surface of floral leaves expand towards outer side due to more cell growths. This makes the flower to open.

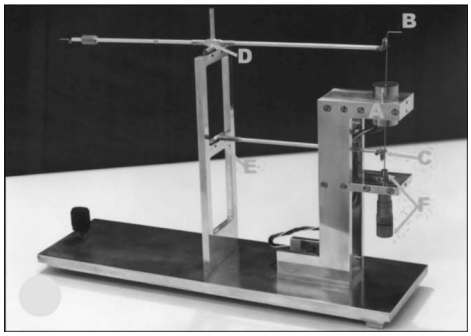
29. Crescograph was invented by :

(a) F.W.Went (b) C.V. Raman
(c) J.C. Bose (d) Charles Darwin

BHU PMT-2001

Ans. (c) : India's greatest scientist sir Jagadish Chandr **Crescograph –** It is a device that is used to measure the growth of plants.

a Bose designed crescograph. It is a plant growth measurement instrument.



Crescograph

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30. Auxetic growth is increase in
(a) cell volume only
(b) cell number only
(c) fatty tissue
(d) intercellular material

BVP-2010

Ans. (a) : Three type of growth are present in multicellular animal
1. Auxetic growth - Increase in cell volume only not in number
2. Multiplication growth – Increase in number not a volume
3. Accretionary growth – Growth due to mitotic division of some special type of cell occurring in specific location.

31. Rapid and dramatic increase in shoot length is called
(a) Triple response growth
(b) Bolting
(c) Scarification
(d) Night break effect

J&K CET-2007

Ans. (b) : Bolting is called rapid and dramatic increase in shoot length. It is seen in flowering plant during long day condition. It can artificially be induced by application of gibberellic acid. It requires either long day or cold treatment.

32. A tree grows at the rate of 0.5m per year. What will be the height of the board fixed at 1.5 m above the base five years ago?
(a) 4.0 m (b) 3.5 m
(c) 1.5 m (d) 4.5 m

J&K CET-2004

Ans. (c) : According to this question
The rate growth of plant is 0.5 m per year
after 5 year, the plant growth will be
$0.5 \times 5 = 2.5 + 1.5\ m = 4\ m$
After 5 years, the height of the board will be the new height of the board minus the initial height of the plant with the board that is, 2.5 m–1.5 m = 1.5m
Therefore the board was fixed at 1.5 m.

B. Phase of Growth and Development

33. Choose the incorrect pair among the following
(a) Biosphere reserve – Indo Burma region
(b) Aravalli Hills – Rajasthan and Gujarat.
(c) Koringa sanctuary – Uttarakhand
(d) Biodiversity hotspot – Himalayan region
(a) B, C (b) A, C
(c) A, D (d) B, D

AP EAPCET-22.05.2023, Shift-II

Ans. (b) : Biosphere reserve are designated areas that conserve biodiversity and promotes sustainable development. They are located in different parts of the world, including the Indo–Burma region. However, the Nanda Devi Biosphere reserve is located in the Himalyas, not in the indo – Burma region.
• Koringa sanctvary – Andhra Pradesh, the koriga Bird sanctuary is protected area in the state of Andhra Pradesh. It is home to a variety of bird species, including the endangered white necked stork.

34. Differentiation is change of tissues from_____
(a) Meristematic to permanent
(b) Simple to complex
(c) Complex to simple
(d) Permanent to meristematic

SRM JEEE-2019

Ans. (a) : Differentiation is change of tissue from meristematic to permanent. A cluster of cells, performing similar functions are known as tissues. In plants, tissues are classified broadly into two groups on the basis of cell division capacity, namely – Meristematic and Permanent tissue. Meristematic tissues in plants consist of a mass of undifferentiated cells whose main function is to participate in plant growth.

35. Which one increases in the absence of light?
(a) uptake of minerals
(b) uptake of water
(c) elongation of internodes
(d) ascent of sap.

SRM JEEE-2018

Ans. (c) : The elongation of internodes is seen to occur in absence of light but uptake of minerals, uptake of water and ascent of sap all this process are related to photosynthesis which occur in the presence of light.

36. Etiolation in plants is caused when
(a) they are grown in dark
(b) they have mineral deficiency
(c) they are grown in intense light
(d) they are grown in blue light

DUMET-2009

Ans. (a) : Etiolation is a process which is characterized by long, weak stems, smaller leaves due to longer internodes and a pale yellow colour. It is caused when the plants grow in dark without or little light.

37. Which pigment involves in photoperiodic change in plants?
(a) Phytochrome (b) Cytochrome
(c) Chlorophyll (d) Anthocyanin

Rajasthan PMT-2009

Ans. (a) : Phytochrome pigment involve in photoperiodic change in plants. It is a pigment that present in green plants and is mainly responsible for photomorphogenic changes and development.
Cytochrome- It is a iron containing heamoproteins. They are electron carriers and they involved in the generation of ATP via electron transport.
Anthocyanin- It is mainly in the form of red to blue flavonoid pigments that are majorly represented in plants.
Chlorophyll – Chlorophyll is a pigment that gives plants their green colour, and it helps plants create their own food through photosynthesis.

38. The morphogenetic property of cytokinin was first experimentally proved by:
(a) Hannig (b) Guha and Maheshwari
(c) Skoog and Miller (d) Went

AP EAMCET-1999

Ans. (c) : The morphogenetic property of cytokinin was first experimentally proved by 'Skoog and Miller'. Cytokinins control aspects of almost all plant growth and development process. They are a class of plant hormones that promote cell division in plant roots.

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39. Who proposed the histogen theory

(a) Nageli (b) Schmidt
(c) Strasburger (d) Hanstein

Rajasthan PMT-1996

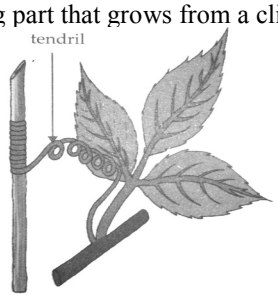
Ans. (d) : The 'Histogen Theory' proposed by 'Hanstein' (1870) and supported by Strasburger (1868). This theory explain three principal tissue of root i.e. vascular cylinder, cortex and epidermis originate different groups of initial, cells or histogen in apical meristem-plerome, problem and dermatogens respectively.

40. Movement of tendrils in response to touch is known as

(a) nyctinastism (b) thigmotropism
(c) seismonastism (d) haptonastism

UP CPMT-2010

Ans. (b) : Movement of tendrils in response to touch is known as thigmotropism. Thigmotropism are movement that happen due to contact with foreign body. Tendrils are a long part that grows from a climbing plant.



Nyctinastism- In plant, it refers to the nastic movement of leaves or petals of higher plants in response to darkness.

Seismonastism- It refers to the movement which is shown by plants on receiving stimulus.

Haptonastism – Haptonasty is a type of growth independent movement observed in Mimosa. In this type of movement, the leaflets fold, and the petioles droop in response to touch.

41. When a plant has different types of leaves, the condition is known as:

(a) heterophylly (b) anisophylly
(c) myremecophylly (d) none of the above

HP CET-2011

Ans. (a) : When a plant has different types of leaves, the condition is known as heterophylly. Heterophylly refers to the different shapes of leaves present at different stages of life or in different environmental conditions in a single plant.

Anisophylly- It means that a plant has two or more shapes and sizes leaves.

Myremecophyly- When ant takes its shelter on some trees such as mango, Litchi, Jamun etc, then this condition is related to myremecophily.

42. The correct sequence of cellular growth stages is

(a) division → differentiation → elongation
(b) differentiation → division → elongation
(c) division → elongation → differentiation
(d) elongation → differentiation → division

MGIMS Wardha-2014

Ans. (c) : According to the given option, the correct sequence of cellular growth stages is as follows.
division → elongation → differentiation
Hence, correct answer is option (c).

43. Grafting involved the formation of a young plant :

(a) with the root of scion and shoot of stalk
(b) with the root of stalk and shoot of scion
(c) by stem cutting
(d) by layering

JIPMER-1999

Ans. (b) : Grafting involved the formation of a young plant with the root of stalk and shoot of scion. Grafting or graftage is a horticultural technique where by tissues of plants are joined so as to continue their growth together.

44. When food supply is poor, the rate of growth is

(a) fast (b) slow
(c) intermediate (d) nil

CG PMT-2007

Ans. (b) : When food supply is poor, the rate of growth is slow. Lag phase is a process that explain the event of growth rate.
Lag phase is the slower phase where cell division is slow. It is also called as period of initial adjustment.

45. The response of plants to light was first of all discovered by:

(a) Lamarck (b) Darwin
(c) Thimann (d) Went

Haryana PMT-1999

Ans. (b) : The response of plants to light was first of all discovered by 'Darwin'.
The response of plants to light is caused due to a chemical process that is called auxin. Auxin was first discovered for its ability to promote growth in plants. This theory was published in 1880, in a book **'The Power of Plant Movement'**.

46. In a longitudinal section of a root, starting from the tip upward, the four zones occur in the following order :-

(a) Root cap, cell division, cell maturation, cell enlargement
(b) Cell division, cell enlargement, cell maturation, root cap
(c) Cell division, cell maturation, cell enlargement, root cap
(d) Root cap, cell division, cell enlargement, cell maturation

AIPMT-2004

Ans. (d) : The root system of a plant develops from the hypocotyls of the embryo of a seed.

- In a longitudinal section of a root, starting from the tip upward, the four zones occur in the following order.
- Root cap → Zone of cell division → Zone of cell enlargement → Zone of cell maturation.

(i) Root cap zone - The apex of each root is covered by a cushion of thin walled cells known as root cap.

(ii) Region of cell division - It lies just behind the root cap it is the main growing region of the root where active cell divisions take place.

(iii) Region of elongation - The region of elongation is responsible for growth in length of the root.

(iv) region of maturation - Epidermal cells of this region give out small, thin, cylindrical unicellular outgrowths, known as root hairs. These are the main absorbing organs of the root.

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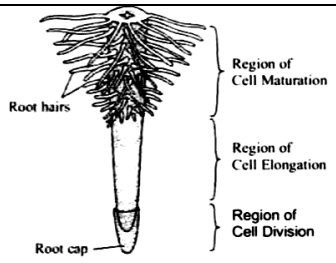

Regions of the root

47. Klinostat is employed in the study of
(a) osmosis (b) growth movements
(c) photosynthesis (d) respiration

AIPMT-1993

Ans. (b) : Klinostat is employed in the study of growth movements. A Klinostat is a device which uses rotation to negate the effect of gravitational pull on plant growth and development.

48. Gibberellic acid induces flowering
(a) in short day plants under long day conditions
(b) in day-neutral plants under dark conditions
(c) in some gymnospermic plants only
(d) in long day plants under short day conditions

AIPMT-1997

Ans. (d) : Gibberellic acid induces flowering in long day plants under short day conditions.Gibberellic acid, a plant hormone stimulating plant growth and development, is a tetracyclic diterpenoid compound.

49. The movement of auxin is largely
(a) centripetal (b) basipetal
(c) acropetal (d) both (a) and (c)

AIPMT-1994

Ans. (b) : Auxin is a growth promoting phytohormone. It moves mainly from the apical to the basal end (basipetally). This type of unidirectional transport is termed polar transport. Auxin is the only plant growth hormone known to be transported polarly.

50. If the growing plant is decapitated, then
(a) Its growth stops
(b) leaves become yellow and fall down
(c) axillary buds are inactivated
(d) axillary buds are activated

AIPMT-1994

Ans. (d) : If the growing plant is decapitated, then axillary buds are activated.

51. Senescence as an active developmental cellular process in the growth and functioning of a flowering plant, is indicated in:
(a) Annual plants
(b) Floral parts
(c) Vessels and tracheid differentiation
(d) Leaf abscission

AIPMT-2008

Ans. (d) : Senescence can be defined as the sum of deteriorative processes which naturally terminate the functional life of an organism. It can occur in a plant or may be limited to a particular plant organ such as leaf and flower or cells such as phloem and xylem. Abscission is natural shedding of leaves, foliage branches, fruits, floral parts etc. According to Leopold (1967) abscission is a senescence phenomenon.
- Abscission is a cell separation process by which plants can shed organs such as fruits, leaves, or flowers. The process takes place in specific locations termed abscission zones.

52. The process in which mature differentiated cells to meristematic activity to form callus is called
(a) Cyto differentiation (b) Redifferentiation
(c) Dedifferentiation (d) Differentiation

Karnataka CET-2007

Ans. (c) : The process in which mature differentiated cell reverse to meristematic activity to form callus is called 'Dedifferentiation'. Dedifferentiation is a phenomenon of reversion of differentiated cell or nuclei to non differentiated.

53. The timing of seasonal activities of plants in relation to change in environment condition is termed as
(a) dendrochronology (b) biological clock
(c) lapse rate (d) phenology

DUMET-2010

Ans. (d) : The timing of seasonal activities plant in relation to change in environmental condition is termed as phenology. It means in summer, fruit ripen. In autumn, leaves change colour and fall in winter, plant rest. It is the study of periodic plant and animal life cycles.
Dendrochronology is the science that deals with the dating and study of the annual growth increments or tree ring in woody trees or shrubs.

54. The branch of science dealing with senescence is called
(a) Serology (b) Genealogy
(c) Gerontology (d) Cosmology

AMU-2002

Ans. (c) : Gerontology:- It is define as the science that deals with ageing. It includes the social, cultural, cognitive and physiological and biological aspects with respect to ageing.
Serology - Serology is the scientific study of serum and other body fluid.
Genealogy - The study of family, origins and history.
Cosmology - Studies how the history of the universe lead to the star, galaxies and other features.

C. Plants growth regulators

55. Identify the Plant Growth Regulators that inhibit apical dominance, delay senescence, promote root hair formation and play an important role in seed development and maturation respectively are
(a) Auxins, Abscisic acid, Ethylene and Cytokinins
(b) Cytokinins, Gibberlic Acid, Ethylene and Absisic acid
(c) Cytokinins, Gibberlic Acid, Auxins, Absisic acid
(d) Auxins, Ethylene, Cytokinins, Gibberelic acid

TS EAMCET-11.05.2023, Shift-II

Ans. (b) : Cytokinins, Gibberlic Acid, Ethylene and Abs sic acid are the plant growth regulators respectively that inhibit apical dominance, delay senescence, promote root hair formation and play an important role in seed development and maturation.

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56. Which of the following is not a secondary metabolite?

(a) Anthocyanin (b) Lecithin
(c) Curcumin (d) Morphine

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Secondary metabolites are produced by certain micro-organism. It's not essential for the growth and reproduction of organisms from which they are not formed. "Secondary metabolites are the chemical compounds that do not participate in plant metabolism".

- Lecithin is not a secondary metabolites because it is a phospholipid. They are found in cell membrane.
- Anthocyanin, curcumin and morphine are the secondary metabolites.

57. Match List-I with List-II.

	List-I		List-II
(A)	**Terpenoides**	**(i)**	**Codeine**
(B)	**Lectins**	**(ii)**	**Diterpenes**
(C)	**Alkaloids**	**(iii)**	**Ricin**
(D)	**Toxins**	**(iv)**	**Concanavalin A**

Choose the correct answer from the options given below:

(a) (A)-(ii), (B)-(iii), (C)-(i), (D) -(iv)
(b) (A)-(ii), (B)-(iv), (C)-(i), (D) -(iii)
(c) (A)-(ii), (B)-(iv), (C)-(iii), (D) -(i)
(d) (A)-(ii), (B)-(i), (C)-(iv), (D) -(iii)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (b) : Usually option (b) is the correct answer because diterpenes belong to the category of terpenoides, concanavalin is a Lectin. Codein is an alkaloid and Ricin is a toxin.

(A) Terpenoids → Diterpenes
(B) Lectins → Concanavalin-A
(C) Alakloids → Codein
(D) Toxins → Ricin

58. For chemical defence against herbivores, Calotropis has

(a) toxic ricin (b) distasteful quinine
(c) cardiac glycosides (d) strychnine

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (c) : These are the glycosides naturally obtained from certain plants and contain active principles which act specifically on the failing heart and make them normal. That's why, they are called cardiac glycosides.

- They increase force of myocardial contraction, but not heart rate.
- Ricin preventing the cells from making the proteins they need.
- Quinine is used to treat malaria caused by plasmodium falciparum.
- Strychnine prevents chemical that controls nerve signals to the muscles.

59. Identify the derivative of carotenoids

(a) Gibberellic acid (b) Indole butyric acid
(c) Indole-3-acetic acid (d) Abscisic acid

AP EAMCET-12.07.2022 Shift-II
AIPMT-2009

Ans. (d) : Abscisic acid is a derivative of carotenoid.

- Abscisic acid (ABA) is a plant hormone that is also as abscisin II or dormin.
- Carotenoids are the source of abscisic acid.
- Carotenoids are essential pigments in photosynthetic organs along with chlorophylls and acts as anti-oxidants, photo protector, precursors of plant hormones in non - photosynthetic organs of plants and colour attractants.

60. The gaseous plant growth regulator is used in plants to :

(a) kill dicotyledonous weeds in the fields
(b) speed up the malting process
(c) promote root growth and root hair formation to increase the absorption surface
(d) help overcome apical dominance

NEET-2022

Ans. (c) : The gaseous plant growth regulator is used in plants to promote root growth and root hair formation to increase the absorption surface.

Gaseous plant growth regulator is ethylene which helps in root growth and root hair absorption and therefore increases the surface area for absorption. Ethylene promotes water absorption by increasing the root's absorption surface.

61. Production of Cucumber has increased manifold in recent years. Application of which of the following phytohormones has resulted in this increased yield as the hormone is known to produce female flowers in the plants :

(a) Cytokinin (b) ABA
(c) Gibberellin (d) Ethylene

NEET-2022

Ans. (d) : Ethylene- Ethylene is a simple gaseous PGR (Plant growth regulator). The hormone finds its use in increasing the yield of cucumber plants by increasing the female flower formation. So the correct answer is Ethylene (C_2H_4).

Cytokinin- Cytokinins are plant hormones that promote cell division or cytokinesis in plant roots and shoots.

Gibberllins- Gibberllins are plant hormones that regulate development processes including stem elongation germination dormancy flowering flower development and leaf and fruit senescence.

ABA- Abscisic acid increases resistance of plants to cold and other types of stresses like drought and water logging etc. It is therefore also known as **stress hormone**.

62. Which of the following statements are false regarding ethephon?

(A) A source of ethylene.
(B) It is slowly absorbed and transported within the plant to release ethylene rapidly.
(C) It causes reduced abscission in flowers and fruits of cotton.
(D) Supresses the internode elongation in deep water rice plants.

(a) A, B, C only (b) B,C, D only
(c) A, C, D only (d) A, B, D only

TS EAMCET-30.07.2022 Shift-II

Ans. (b) : Ethephon is a plant growth regulator used to promote fruit ripening, abscission, flower induction and other responses. $C_2H_6ClO_3P$ is the formula of ethephon. Ethephon is an herbicide, has advantages in controlling the invasive species of *Ipomea cairica.*

- Ethephon in an aqueous solution is readily absorbed and transported within the plant and release ethylene slowly.

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63. Match the following?

Column – I	Column - II	Column - III
(a) Francis Darwin	(i) Coconut milk	(p) Auxin
(b) F.W. Went	(ii) Rice seedling	(q)Phototropism
(c) E.Kurosawa	(iii) Coleoptiles of canary grass	(r) Kinetin
(d) F. Skoog	(iv) Oats seedlings	(s) Gibberellic acid

(a) (a – iii – q), (b – iv – p), (c – ii – s), (d – i – r)
(b) (a – iv – p), (b – iii – r), (c – i – q), (d – ii – s)
(c) (a – ii – s), (b – i – q), (c – iii – p), (d – iv – r)
(d) (a – i – r), (b – ii – s), (c – iv – p), (d – iii – q)

AP EAMCET-03.09.2021 Shift-I

Ans. (a) : Charles Darwin & his son studies photo-tropism studying coleoptile of canary grass & oats.

- Went first discovered auxin at coleoptiles tip.
- Skoog and miller discovered Kinetin in coconut milk.
- Kurosawa discovered gibberellic acid from fujikuroi fungus found in rice.

64. Match the following concerning the activity function and the phytohormone involved.

A.	**Fruit ripener**	**i.**	**Abscisic acid**
B.	**Herbicide**	**ii.**	**GA_3**
C.	**Bolting agent**	**iii.**	**2, 4-D**
D.	**Stress hormone**	**iv.**	**Ethephon**

Select the correct option from following

(a) (A)-(iv), (B)-(ii), (C)-(i), (D)-(iii)
(b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)
(c) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)
(d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

NEET-2020 Phase-II

Ans. (d)		
(A)	Fruit ripener	Ethephon
(B)	Herbicide	2, 4-D
(C)	Bolting agent	GA_3
(D)	Stress hormone	Abscisic acid

65. Match the following plant hormones given in the List-I with their main corresponding physiological effects, presented in the List-II

	List-I		List-II
A	**Auxin**	**i**	**Cell division**
B	**Gibberellins**	**ii**	**Fruit ripening**
C	**Ethylene**	**iii**	**Bolting in cabbage**
D	**Abscisic acid**	**iv**	**Apical dominance**
		v	**Seed dormancy**

The correct match is:

	(A)	(B)	(C)	(D)
(a)	i	iv	ii	iii
(b)	iv	iii	ii	v
(c)	iii	iv	v	ii
(d)	iv	v	iii	i

TS EAMCET-09.05.2019 Shift-I

Ans.(b):	
List - I	**List-II**
(A) Auxin	Apical dominance
(B) Gibberellins	Bolting in cabbage
(C) Ethylene	Fruit ripening
(D) Abscisic acid	Seed dormancy

66. It takes very long time for pineapple plants to produce flowers. Which combination of hormones can be applied to artificially induce flowering in pineapple plants throughout the year to increase yield?

(a) Gibberellin and Cytokinin
(b) Gibberellin and Abscisic acid
(c) Cytokinin and Abscisic acid
(d) Auxin and Ethylene

NEET-2019

Ans. (d) : Auxin and Ethylene combination of hormones can be applied to artificially induce flowering in pineapple plants throughout the year to increase yield.
Auxin -: Auxin promotes pineapple flowering.
Ethylene -: Ethylene is a gaseous plant hormone. It also helps in synchronization of flowering and fruit set up in pineapple.
Hence, the (d) one is the right answer.

67. Zeatin isolated from

(a) Rice (b) Wheat
(c) Agro-bacterium (d) Maize

SRM JEEE-2019

Ans. (d) : The first natural cytokinin was obtained from unripe maize grains of kernels by Letham 1964. It is known as Zeatin (6 – hydroxy 3 – methyl 2 – butenyl amino – purine). It also occurs in coconut milk. Zeatin is a plant hormone derived from the purine base called adenine. Zeatin belong to the family growth hormone called cytokinins.

68. Functions not induced by Cytokinins

i. Production of leaves
ii. Production of chloroplasts
iii. Nutrient mobilization
iv. Leaf senescence
v. Xylem differentiation
vi Synthesis of carotenoids

Options

(a) i, ii, iii (b) iv, v, vi
(c) ii, iv, v (d) iii, iv, vi

AP EAMCET-25.04.2018 Shift-II

Ans. (b) : Cytokinins functions induced by production of leaves, production of chloroplasts, nutrient mobilization. Leaf senescence has the important function of recycling nutrients, mostly nitrogen to growing and storage organs of the plant.

69. In a garden, the gardner cut the apical bud of Lawsonia (Mehandi) because _____

(a) The length should be limited in Lawsonia
(b) Due to the cutting of apical bud the effect of auxins decreases and lateral bud grows and forms dense appearance that is why it can give a definite shape
(c) Other apical bud grows quickly due to cut of apical bud
(d) Due to the cutting of apical bud effect of ethylene decreases and plant growth rapidly

GUJCET-2017

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Ans. (b) : In a garden, the gardner cut the apical bud of Lawsonia (Mehandi) because of due to the cutting of apical bud the effect of auxins decreases and lateral bud grows and forms dense appearance that is why it can give a definite shape.

70. Artificial application of auxins like IAA, IBA and NAA to unpollinated pistils can form

(a) Fruits with much flash (b) Larger fruits
(c) Sweet fruits (d) Seedless fruits

BVP-2010
MGIMS Wardha-2009

Ans. (d) : Artificial application of auxins like IAA, IBA and NAA to unpollinated pistils can form seedless fruits. Auxin is a plant hormone that is produced in the stem tip that help cell elongation. Auxins also promote flowering and prevent dropping of fruits and leaves at early stage.

71. ABA closes stomata but which hormone encourages them to open?

(a) GA (b) Auxin
(c) Cytokinin (d) Ethylene

BHU PMT (Screening)-2011

Ans. (c) : ABA closes stomata but cytokinin hormone encourages them to open. Cytokinin also help in plants growth and cytokinesis in different parts of the plant. This hormone controls the opening of stomata. It also has a major role in plant pathogenesis by including disease resistance to certain pathogens.

72. Compare the statements A and B
Statement A: Auxins promote apical dominance by suppressing the activity of lateral buds.
Statement B: In moriculture, periodic pruning of shoot tips is done to make mulberry plants bushy.
Select the correct description.

(a) Both the statements A and B are correct and A is the reason for B
(b) Statement A is correct and B is wrong
(c) Statement A is wrong and B is correct
(d) Both the statements A and B are correct and A is not the reason for B

Manipal-2009

Ans. (a) : According to the given statements A and B are correct and A is the reason for B. Hence, it is clear that option (a) is a correct answer.
Here assertion describes a function of auxins, pruning of mulberry shoots reducing the effect of apical dominance and promotes lateral growth.

73. Match the following column I with column II.

	Column - I		Column - II
A.	Abscisic acid (ABA)	1.	Malt yield in barley grains.
B.	Cytokinin	2.	Excised radish cotyledon expansion test.
C.	Gibberellin	3.	Avena coleoptiles curuatuse test.
D.	Auxin	4.	Horizontal stem growth induction.
E.	Ethylene	5.	Rice seeding growth inhibition test.

(a) A-1 B-2 C-3 D-4 E-5
(b) A-5 B-1 C-2 D-3 E-4
(c) A-5 B-2 C-1 D-3 E-4
(d) A-2 B-1 C-4 D-3 E-5

VMMC-2015

Ans. (c) : According to the given column I and column II data, the correct answer is option (c).

Hormone	Function
Abscisic acid (ABA)	Rice seeding growth inhibition test
Cytokinin	Excised radish cotyledon expansion test
Gibberellin	Malt yield in barley grains
Auxin	Avena coleoptiles curuatuse test
Ethylene	Horizontal stem growth induction

74. During a tissue culture process the student added a chemical X to the set up. After a few days, new green shoots are observed to be appearing on the callus. What was added in the form of X to this set up ?

(a) Auxin (b) Cytokinin
(c) Gibberellins (d) Terpenes

VMMC-2015

Ans. (b) : During a tissues culture process the student added a chemical X to the set up. After a few days, new green shoots are observed to be appearing on the callus. For this set up was added cytokinin. Cytokinins are involved in performing cell division in plant roots and shoot system.

75. Mitosis can be inhibited by

(a) auxin (b) colchicine
(c) cyclins (d) insulin

VMMC-2015

Ans. (b) : Mitosis can be inhibited by colchicine. It is commonly known as *Autumn crocus*. Colchicine prevents cell from forming spindles during mitosis, inhibiting chromosomal segregation during anaphase. It induces multiple sets of chromosomes.
It is also used in cancer therapy to suppress cell division.

76. One of the commonly used plant growth hormone in tea plantations is

(a) ABA (b) Zeatin
(c) IAA (d) Ethylene

Rajasthan PMT-2011

Ans. (c) : One of the commonly used plant growth hormone in tea plantations is IAA. IAA is a type of auxin present in the plant. Indole-3 acetic acid is the synthetic plant hormones which is important in tea plantation.

77. Gibberellin was obtained form :

(a) Gibberella fujikuroi (b) Aspergillus
(c) Yeast (d) none of the above

Rajasthan PMT-2000

Ans. (a) : In 1926 Japanese scientist Eiichi Kurosawa identified that foolish seedling disease was caused by the fungus Gibberella fujikuroi. It induces flowering in long day plants. This process is normally dependent on exposure to long days or low temperature. It controls major parts of plant, growth such as flower development, germination, and flowering time. It is a group of plant hormones responsible for plant growth.

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78. How does pruning help in making the hedge dense?
(a) It induces the differentiation of new shoots from the rootstock
(b) It frees auxiliary buds from apical dominance
(c) The apical shoot grows faster after pruning
(d) It releases wound hormones

CMC Ludhiana-2009

Ans. (b) : Pruning is the process of cutting shoot tips to promote the lateral growth of branches.
- When pruning frees auxiliary buds from apical dominance it helps in making the hedge dense. Pruning is essential for maintaining attractive and healthy trees and shrubs.
- Apical dominance is the phenomenon by which presence of apical buds does not allow the nearby lateral buds to grow. Apical buds produce high concentration of hormone auxin which inhibits the growth of lateral buds. When the apical buds are removed by pruning, the lateral buds sprout . This produces dense bushy growth.

79. 6-(4-hydroxy-3 methyl-trans-2-butenyl amine) purine is also called as
(a) Methyl jasmonate (b) Zeatin
(c) Brassinolide (d) Triacontanol

AMU-2015

Ans. (b) : 6-(4-hydroxy-3 methyl-trans-2-butenylamine) purine is also called as zeatin. It is a type of cytokinin. Cytokinin promotes cell division in plant, roots, and shoots.
Brassinolide - It is a plant steroid hormones that are essential for plant growth.
Triacontanol-It is an endogenous plant growth regulator which facilitates numerous plant metabolic activities leading to better growth and development.
Methyl jasmonate – Methyl jasmonate and its free-acid jasmonic acid, collectively referred to as jasmonates, are important cellular regulators involved in diverse developmental processes, such as seed germination, root growth, fertility, fruit ripening, and senescence.

80. Primary precursor of IAA is:
(a) phenylalanine (b) tryptophan
(c) Cycas (d) Pteris

BHU PMT-2003

Ans. (b) : Primary precursor of IAA(Indole -3- acetate or Auxin) is tryptophan.The precursor of auxin is tryptophan and Zn.
Cycas- It is only the living genus identified in the cycadaceae. Cycas is a gymnosperm mainly found in the eastern and south eastern Asian region.
Pteris - They are native to tropical and subtropical regions. They are terrestrial genus that inhabits shady and moist forest.
Phenylalanine – It is an essential amino acid. It is found in high-protein foods. It may improve memory and learning ability. It may enhance mood and alertness.

81. The term cytokinin was coined by:
(a) Letham (b) Mendel
(c) De Vries (d) None of these

Rajasthan PMT-1996

Ans. (a) : The term cytokinin was coined by Letham.Cytokinins are present in all plant tissues. They are abundant in the root tip, shoot apex, and immature seeds.

82. Highest concentration of auxin is found in
(a) root and shoot tips (b) leaves and fruits
(c) mid stem portion (d) none of the above

UP CPMT-2003

Ans. (a) : Highest concentration of auxin is found in root and shoot tips. Auxin was first isolated from human urine. They are generally produced by growing apices of stem and roots. Auxin also induce parthenocarpy, e.g. in tomatoes. Auxin also controles xylem differentiation and help in cell division.

83. Compare the statement A and B.
Statement: A Ethylene is a gas which acts as growth regulator of plants.
Statement: B It is the most simple plant hormone.
(a) Both the statements A and B are correct and B is the correct explanation of A.
(b) Both the statements A and B are correct and B is not correct explanation of A.
(c) Statement A is correct and B is wrong
(d) Statement A is wrong and B is correct

Manipal-2011

Ans. (b) : Ethylene is a gaseous plant hormone that controls many activities in plants. Ethylene is a most simple plant hormone which is synthesized in the ripening fruits and tissues undergoing senescence.
According to the given statements A and B both are correct but B is not correct explanation of A. Hence it is clear that correct answer is option (B).

84. Mobilization of stored food in germinating seed is triggered by
(a) ABA (b) GA
(c) cytokinin (d) ethylene

AFMC -2009

Ans. (b) : Mobilization of stored food in germinating seed is triggered by GA or Gibberellins. Gibberellins or gibberellic acids promote the process of germination because they hydrolyze and mobilize the food store in the endosperm by releasing the enzymes from the aleurone layer.
- ABA plays an important role in seed development, maturation and dormancy.
- Ethylene induces fruits ripening, breaks seed dormancy.

Cytokinin hormone helps in promoting the cells growth, development, differentiation, affecting apical dominance and delay in leaf senescence.

85. The scientist, who performed some experiments with oat coleoptiles for the presence of a substance which could diffuse into agar blocks is
(a) Ganong (b) Went
(c) Boysen-Jensen (d) Fujikura

J&K CET-2009

Ans. (b) : The scientist who performed some experiments with oat coleoptiles for the presence of a substance (i.e. for auxin) which could diffuse into agar blocks is Went.

86. Which of the following movements in plants is related to the changes in the auxin level?
(a) Movement of shoot towards the source of light
(b) Nyctinasty
(c) Movement of sunflower towards sun
(d) All of the above

J&K CET-2009

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Ans. (a) : The movements in plants is related to the movement of shoots towards of light due to changes in the auxin level. Sun is an important source of digit for all the organism in the world. If a plant moves in response to sunlight during daytime then, it is called heliotropism. Phototropism is the general response of a plant towards light.
Nyctinasty- If a plant grows in response to darkness that phenomenon is called nyctinastic plants.

87. Length of grapes stalks increases due to
(a) auxin (b) cytokinins
(c) gibberellins (d) ethylene
J&K CET-2014

Ans. (c) : Length of grapes stalks increases due to gibberellins. Gibberellins are responsible for elongation of stem leaf expansion, bolting, enzyme formation etc. Their ability to cause increase in length of axis is used to make stalk of grapes to grow larger and as certain better yield.

88. Select the correctly matched pair
(a) C. Darwin and S.F. Darwin - Gibberellic acid
(b) F.W. Went - Auxin
(c) E.Kurosawa - Ethylene
(d) Skoog and Miller - Abscisis acid
(e) Cousins - Cytokinin
Kerala PMT-2015

Ans. (b) : C. Darwin and S.F. Darwin first studied the effect of light on the bending of coleoptiles of canary grass and oats. This phenomena is called phototropism.
- F.W. Went discovered the first plant hormone auxin in the tip of oat coleoptiles.
- Cousins demonstrated that remature ripening of bananas.
- E. Kurosawa extracted gibberellins from the fungus Gibberella fujikuroi and reported that it caused extreme elongation of rice stems.
- Skoog and Miller are identified with the study of morphogenesis of callus or mass of tissue into roots and shoots.

Hence, it is clear from the above explanation that option (b) is correct answer.

89. Internodal elongation is associated with
(a) auxin (b) cytokinin
(c) gibberellin (d) ABA
J&K CET-2012

Ans. (c) : Internodal elongation is associated with gibberellin. This properties is used in agriculture to the yield from sugarcane. It changes take place in the cells of internodal region increasing its length 3 to 4 times the original.

90. Which of the following growth hormones is associated with stomatal movements?
(a) Auxin (b) Gibberellin
(c) ABA (d) Cytokinin
J&K CET-2012

Ans. (c) : ABA growth hormones is associated with stomatal movements. Application of exogenous ABA to leaves of normal plants causes closing of stomata within few minute. Stomata are tiny pores present on the surface of the leaves. Massive amount of gaseous exchanges take place in the leaves through these pores for the purpose of photosynthesis. But it is important to note here that the exchange of gases occurs across the surface of stems, roots, and leaves as well.

91. Which one of the following pairs, is not correctly matched?
(a) Abscisic acid - Stomatal closure
(b) Gibberellic acid - Leaf fall
(c) Cytokinin - Cell division
(d) IAA - Cell wall elongation
Rajasthan PMT-2010

Ans. (b) : Correct functions of the questions option is as follows.
(a) Abscisic acid → Stomatal closure
(b) Gibberellic acid → Plant growth
(c) Cytokinin → Cell division
(d) IAA → Cell wall elongation
Hence, it is clear from above explanation that option (b) is not correctly matched.

92. The most essential precursor of ethylene is
(a) adenine (b) thiocarbamate
(c) zearin (d) methionine
AMU-2011

Ans. (d) : The most essential precursor of ethylene is methionine for the plants to grow and reproduce they need sun, water minerals and other nutrients. Plant also relay an certain organic compounds to signal and monitor their growth. Ethylene is a plant hormone that is found in gaseous form in nature. It is primarily found in all dividing cells.

93. Seedless watermelons are obtained by
(a) triploidy (b) gibberellin application
(c) haploidy (d) vegetative propagation
AMU-2011

Ans. (a) : Seedless watermelons are produced on triploid plants (3 sets of chromosome). Which come from the cross of diploid (2 sets) and tetraploid (4 sets) plants.

94. Which one of the following plant function is not controlled by auxins?
(a) Apical dominance (b) Phototropism
(c) Growth (d) Photosynthesis
AMU-2010

Ans. (d) : Apical dominance, phototropism and growth are plant function that is controlled by auxins but photosynthesis is not controlled by auxins. Photosynthesis is a light dependent anabolic process which is not dependent on auxin hormone.

95. Polyploidy can be induced by the application of
(a) auxin (b) kinetin
(c) colchicine (d) ethylene
Uttarakhand PMT-2009

Ans. (c) : Polyploidy can be induced by the application of colchicine. An organism having more than two sets of chromosomes is called polyploid. It is especially common in plants. Polyploidy is the presence of three or more chromosome set in an organism.
Colchicine chemical is used for induction of polyploidy.

96. Although the seeds are rich in auxin glucosyl esters, still they do not exhibit any physiological change like growth. The reason is:
(a) they are prime examples of bound auxins
(b) they are example of bound auxins that are inactive until IAA is released by enzymolysis
(c) that they are examples of free auxins
(d) none of the above
VMMC-2006

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Ans. (b) : Although the seeds are rich in auxin glucosyl esters, still they do not exhibit any physiological change like growth. The reason is that they are example of bound auxins that are inactive untill IAA is released by enzymolysis. Hence, option (b) is correct.

97. The phytochemical quercetin is found in which of the following ?

(a) grapes (b) apples
(c) guava (d) lemon

VMMC-2006

Ans. (b) : The phytochemical quercetin is found in apples. Apples are a widely consumed, rich source of phytochemical, and epidemiological studies have linked the consumption of apples with reduced risk of some cancers, cardiovascular disease asthma and diabetes.

98. Match the phytohormones given in Column-I with their functions given in Column-II. Choose the answer with correct combination of alphabets.

	Column - I (Phytohormones)		Column - II(Functions)
A	Auxins	p.	breaking seed dormancy
B	Gibberellines	q.	inducting fruit ripening
C	Cytokinins	r.	formation of abscission layer
D	Ethylene	s.	root initiation
		t.	chloroplast development and chlorophyll synthesis

(a) A = p, B = r, C = q, D = s
(b) A = r, B = s, C = p, U = t
(c) A = s, B = p, C = t, D = q
(d) A = s, B = t, C = r, D = q

Karnataka CET-2003

Ans. (c) : According to the question, the correct combination is option (c)

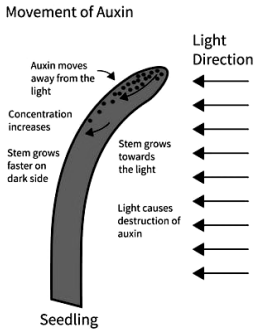
Phytohormones	Function
Auxins	Root initiation
Gibberellines	Breaking seed dormancy
Cytokinins	Chloroplast development and chlorophyll synthesis
Ethylene	Inducting fruit ripening

99. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows ?

(a) Green plants seek light because they are phototropic
(b) Light stimulates plant cells on the lighted side to grow faster
(c) Auxin accumulates on the shaded side, stimulating greater cell elongation there.
(d) Green plants need light to perform photosynthesis

AIPMT-2015

Ans. (c) : Auxin accumulates on the shaded side, stimulating greater cell elongation there. Green plants need light to perform photosynthesis. Green plant seek light because they are phototropic. One important light response in plants is phototropism, which involves growth toward or away from-a light source. Positive phototropism is growth towards a light source, negative phototropism is growth away from light.



100. Identify the pair of physiological effects of two phytohormones which are synthesized from different amino acids.

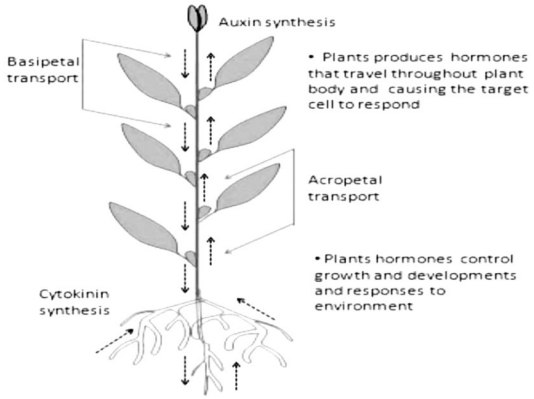
i. Formation of perennating buds in Lemna.
ii. Simultaneous flowering in pineapple.
iii. Bolting in cabbage
iv. Apical dominance in Polyalthia.

The correct pair is

(a) ii, iv (b) i, iv
(c) ii, iii (d) i, ii

AP EAMCET-2008

Ans. (b) : Auxin is synthesised in shoot apices, leaf primordia etc from amino acid tryptophan and cause an apical dominance. NAA and 2, 4-D (both auxins) are employed for inducing flowering in litchi and pineapple. Buds develop when cytokinins are in excess.



101. Through their effect on plant growth regulators, what do the temperature and light control in the plants

(a) Closure of stomata (b) Fruit elongation
(c) Apical dominance (d) Flowering

AIPMT (Mains)-2012

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Ans. (d) : Plants are controlled by the temperature and light falling on them for the process of flowering.

Light and temperature may affect flowering in plants in various ways.

- The effects of photoperiods or daily duration of light hours (and dark period) on flowering is called photoperiodism eg. In short day plant these plant flower when the days are shorter. They need less than the critical duration eg. Soyabean, tobacco etc.

In long day plant, plants flower when the days are long. they require more than the critical duration.

eg. Spinach, Raddish, Hibiscus. etc.

102. A chemical believed to be involved in flowering is

(a) gibberellin (b) kinetin
(c) florigen (d) IBA

AIPMT-1991

Ans. (c) : Chailakhyan (1936), a Russian investigator who researched on Photoperiodism proposed the term florigen. According to him 'florigen complex, the true flowering hormone.

103. Cut or excised leaves remain green for long if induced to root or dipped in

(a) gibberellins (b) cytokinins
(c) auxins (d) ethylene

AIPMT-1988

Ans. (b) : Cut or excised leaves remain green for long if induced to root or dipped in cytokinin.

• Cytokinin help cell in retaining chlorophyll for longer time. Cytokinins delay the senescence (ageing) of leaves and other organs

104. Bananas can be prevented from over-ripening by

(a) maintaining them at room temperature
(b) refrigeration
(c) dipping in ascorbic acid solution
(d) storing in a freezer

AIPMT-1992

Ans. (c) : Bananas can be prevented from over-ripening by dipping in ascorbic acid solution.

105. Dwarfness can be controlled by treating the plant with

(a) Cytokinin (b) Gibberellic acid
(c) Auxin (d) Anti-gibberellin

AIPMT-2000, 1992

Ans. (b) : Dwarfness can be controlled by treating the plants with gibberellic acid. It has been proven that dwarf plants have lower level of GA, which causes the dwarfism. Thus the external supply causes rapid elongation of internodes.

106. Perishable vegetables can be maintained fresh for a longer period by spraying on them with a solution of:

(a) ABA (b) Cytokinin
(c) Ethephon (d) Phenyl mercuric acetate

Karnataka CET-2012

Ans. (b) : Cytokinin :- Cytokinins are plant growth hormones. They are amino derived. These hormones promotes cell division in plant. Cytokinins play important roles in fruit development, especially in cell division.

Hence, perishable vegetables are sprayed with a solution of cytokinin to keep them fresh for a longer time and increases their shelf life.

107. Which one of the following synthetic growth regulators is used to promote synchronized flowering in pineapple ?

(a) Phenylmercuric Acetate
(b) Benzyl Aminopurine
(c) 2-chloroethylphosphonic acid
(d) Indolebutyric acid

Karnataka CET-2010

Ans. (c) : 2–chloroethyl phosphonic acid also known as 'Ethepon' is used for ripening of fruit as it release ethylene.

The 2-Chloroethyl phosphoric acid is a compound which is used for the plant growth and helps in the ripening of the fruit quickly. It is widely used to initiate the reproductive development of the pineapple, these are sprayed on the mature pineapple that is green pineapple, they are then converted to ethylene that has low toxic levels and thus, flowering is promoted.

108. Which one of the following plant hormone was isolated from human urine?

(a) Synthetic auxin 2, 4-D,
(b) Gibberellins
(c) Heteroauxin indole acetic acid
(d) IBA

UP CPMT-2014

Ans. (c): The most important phytohormones "Auxin" (indole -3- acetic acid) was first isolated by Kogl and Haegan Smith (1934) in human urine.

109. Which one combination of plant growth regulators are used for feminising effect in cucurbits?

(a) Auxins > Ethylene > Cytokinins
(b) Gibberellins > Auxins > Cytokinins
(c) Ethylene > Gibberellins > Auxin
(d) Auxin + Gibberellins = 1

UP CPMT-2014

Ans. (a): Auxins, Ethylene and Cytokinins phytohormone are used for sex expression inducing formation of more female flower in place of male flower in cucurbits. Auxins is more effective to induce feminizing effect in cucurbits.

110. The chemical nature of gibberellins is that they are

(a) Acidic (b) Alkaline
(c) Proteinaceous (d) Amines

Karnataka CET-2006

Ans. (a) : Chemical nature of gibberellins are acidic. Gibberellins are plant growth regulators that facilitate cell elongation, help the plants to grow taller. Gibberellin was discovered by E. Kurosawa in 1926 while investigating foolish seeding (balance) disease. It was caused by a fungus Gibberella fujikuroi.

111. The carbon ratio of lutein, abscisic acid and GA_{27} is

(a) 6 : 3 : 4 (b) 5 : 3 : 4
(c) 8 : 3 : 4 (d) 4 : 3 : 5

AP EAMCET-2010

Ans. (c) : The number of carbon atom in lutein = 40
The number of carbon atom in abscisic acid = 15
The number of carbon atom in GA_{27}= 20
The carbon ratio of lutein, Abscisic acid and GA_{27} is 8 : 3: 4

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112. Green potatoes are toxic due to
(a) Phytoalexins (b) Solanine
(c) Triazine (d) Hormones
BHU PMT (Screening)-2009

Ans. (b) : Potato some time becomes green which may indicate high levels of a potentially toxic compound which is called solanine which is exposed after the vegetable is exposed in the light solanine is also present in the sprout, root and leaves of a potato. The substance is a neutering if a person eats solanine. It causes headaches, diarrhoea, stomach cramp and nausea.

113. An example of mitogen is
(a) cytokinin (b) glucose
(c) glycerol (d) fructose
AMU-2015

Ans. (a) : An example of mitogen is cytokinin. Any agent that stimulates cell division is called mitogen.
Mitogens are non- specific stimulants of immune cells.Mitogens are signals that act from outside the cell to induce mitosis and cell division.

114. Which of the following is an anti auxin used in picking cotton balls ?
(a) TIBA (2, 3, 5-triiodobenzoic acid)
(b) PCIP (P-chlorophenoxy isobutyric acid)
(c) PAA (Phenyl Acetic acid)
(d) 2, 4-dichloro phenoxy acetic acid
CMC Ludhiana-2015

Ans. (a) : TIBA (2, 3, 5 Triiodobenzoic acid) is an anti auxin that used picking cotton balls. It is used as a plant growth regulator and controller.

115. Sprouting of potato can be prevented in storage by
(a) maleic hydrazide (b) gibberellins
(c) indole acetic acid (d) cytokinins
WB JEE-2007

Ans. (a) : Maleic hydrazide is also generally known as Fazor. It is a plant growth regulator (sprout inhibitor) that inhibit the division of cell but not stopped the growth of cell. It is used to control sprouting of potato and onions.

D. The photoperiodism

116. The plant respond to photo-periods due to the presence of:
(a) phytochromes (b) stomata
(c) enzymes (d) phytohormones
WB JEE-2006 / VMMC-2003
Karnataka CET-2001 / Haryana PMT-2001

Ans. (a) : The plant respond to photo-periods due to the presence of phytochromes. It is universally present in green plants and is mainly responsible for photomorphogenetic changes and developmental process in them.

117. The production of the flowers in response to light hours in a day is
(a) Photoperiodism (b) Photatropism
(c) Phototaxis (d) Photokinesis
AP EAPCET-23.05.2023, Shift-I

Ans. (a) : The production of flowers in response to light hours in a day is called photoperiodirm. Photoperiodism is an important adaptation that helps plants to flower at the right time of year. This ensures that the plants are able to reproduce when conditions are most favorable.

118. The site of perception of light in plants during photoperiodism is
(a) Leaf (b) Shoot apex
(c) Stem (d) Axillary bud
NEET-2021

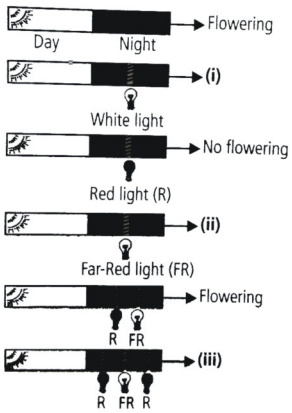
Ans. (a) : Photoperiodism refers to the responses related to the lengths of dark and light periods the site of perception of photoperiod is leaves. The hormone florigen, which are responsible for flowering, induces flowering as it migrates from leaves to shoot apical on induction of required photoperiods.

119. What is the site of perception of photoperiod necessary for induction of flowering in plants?
(a) Pulvinus (b) Shoot apex
(c) Leaves (d) Lateral buds
NEET-2019

Ans. (c) : The site of perception of photoperiod necessary for induction of flowering in plants is the leaves.

120. Flash of light in dark inhibits flowering in
(a) SDP (b) LDP
(c) LSDP (d) DNP
MGIMS Wardha-2009

Ans. (a) : Flash of light in dark inhibits flowering in SDP. Flash of light in dark occurs in those plants that begin flowering when day are shorter. SDP refers to short day plants. These plants need a big day duration that lasts between 7 to 8 hours and they need continuous dark periods that range between 16 to 17 hours.
LDP- It refers to the long day plants. These plants occur when days are longer, this latter is completely opposite from SDP.
LSDP- It is known as long-short day plants. These plants consumes very less amount of sulphur.
DNP : – Day neutral plants (DNP) do not depend upon the amount of darkness or daylight hours. Examples of day neutral plants are sunflower, cucumber, tomato.



121. Exposure to light inhibits the process of germination in the seeds of following plant:
(a) Allium (b) Lactuca
(c) Capsella (d) Tobacco
AP EAMCET-2002

Ans. (a) : Exposure to light inhibits the process of germination in the seeds of Allium plant. Plants are classified into two categories depending on their responses to light for germination. Those plants that require light to germinate have been named positive photoblastic. The process of development of new plant that originates from the embryo present in the seed is called germination.

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122. Direction (A): Each of the question below consist of two statements an Assertion (A) and a Reason (R). Mark of the appropriate response as under : (A). A farmer does not prefer to grow tobacco plant under long day conditions. (R). Tobacco is a short days plant.

(a) If both A and R are correct and the R is a correct explanation of A.
(b) If both A and R are correct but R is not a correct explanation of A.
(c) A is true but R is false.
(d) Both A and R are false.

Haryana PMT-2003

Ans. (a) : Tobacco is an example of short days plants. Short day plants are those plant that start flowering when the length of the day is below to its critical length. To flower, they need a longer time of darkness and little time of light. Hence, it is clear that A and R are correct and R is a correct explanation of A.

123. Which of the following induces flowering in long day plants?

(a) Gibberellins (b) Cytokinin
(c) Auxins (d) Ethylene

Uttarakhand PMT-2008 BVP-2007

Ans. (a) : Gibberellins induces flowering in long day plants. It is acidic in nature. It promotes maleness in Cannabis.

Ethylene- Ethylene is a hormone that gives rise to fruits, flowers and seeds in plants.

Auxins- It is the phytohormone responsible for the growth of the roots and promotes apical dominance.

Cytokinin:– Cytokinins are a group of plant growth regulators which are primarily involved in performing cell division in plant roots, shoot system.

124. Beta vulgaris is a

(a) Short day plant (b) Long day plant
(c) Day neutral plant (d) Intermediate plant

J&K CET-2007

Ans. (b) : Beta vulgaris is a long day plant. It is a species of flowering plant in the subfamily Betoideae of the family Amaranthaceae. Economically it is the most important crop of the large order.

125. Genetic dwarfness can be overcome by treating with

(a) Cytokinin (b) Auxins
(c) Gibberellins (d) Ethylene

HP CET-2012

Ans. (c) : Genetic dwarfness can be overcome by treating with Gibberellins. It is a plant growth regulator. They help in seed germination to overcome dormancy of buds, and for delaying senescence.

126. Which hormone causes stunted growth in pea?

(a) Gibberellic acid (b) Auxin
(c) Cytokinin (d) Ethylene

HP CET-2012 / VMMC-2004

Ans. (d) : Ethylene hormone causes stunted growth in pea. It prevents elongation of stem and roots in longitudinal direction however the inhibition of growth in length is associated with radial enlargement of the tissue. It also causes suppression of bud growth and causes apical dominance.

127. Short day plant is

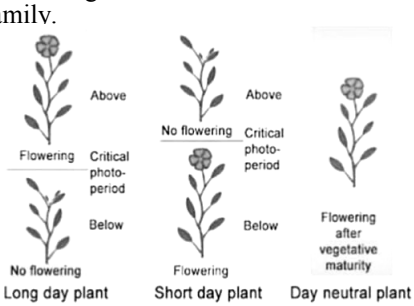
(a) Xanthium (b) Pisum
(c) Cucumis (d) Avena

Manipal-2010 / Haryana PMT-2007

Ans. (a) : Short day plant is Xanthium. It is a genus of flowering plants in the tribe Heliantheae.

Cucumis- It is a genus of twining, tendril-bearing plants in the family Cucurbitaceae which includes the cucumber, muskmelons, etc.

Avena- It is a genus of Eurasian and African plants in grass family.

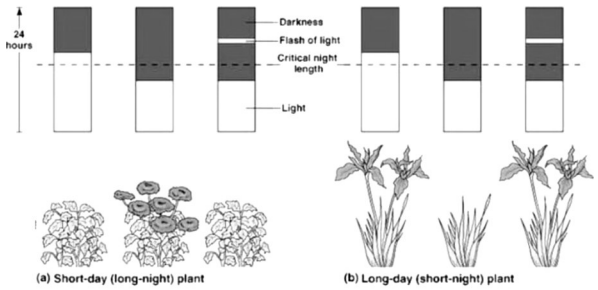


128. Which of the given is a long day plant?

(a) Glycine max (b) Spinach
(c) Chrysanthemum (d) Tobacco

Manipal-2012 / AFMC-2010

Ans. (b) : Spinach is a long day plant. Long day plants grow when the daylight is more than their required photoperiods which is seen in summers. These plants needs more light as compared to short day plants and they usually flower when the temperature becomes warmer.

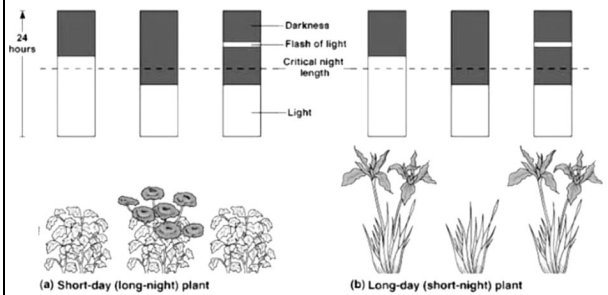


129. Which of the following is long day plant (LDP)

(a) Sugarcane
(b) Guldaudi
(c) Tobacco and Soybean
(d) Wheat and Raddish

Haryana PMT-2008 / Rajasthan PMT-2000

Ans. (d) : Wheat and raddish is long day plant. They grow when the daylight is more than their required photoperiods which is seen in summers.



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130. When flowering is regulated by length of day and night, it is called
(a) photoperiodism (b) phototropism
(c) nyctinasty (d) seismonasty
(e) None of these

CMC Vellore-2010

Ans. (a) : When flowering is regulated by length of day and night, it is called photoperiodism. Photoperiodism is the physiological reaction of organism to the length of day or night. It occurs in plants and animals. Photoperiodism can also be defined as the developmental responses of plants to the relative lengths of light and dark periods.

131. Which of the following is a day neutral plant ?
(a) Helianthus annuus
(b) Euphorbia pulcherrima
(c) Avena sativa
(d) Beta vulgaris
(e) None of the above

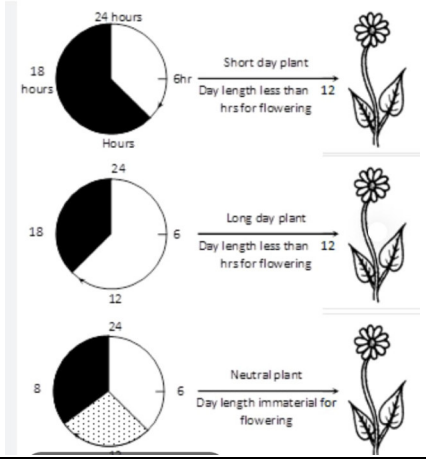
CMC Vellore-2010
AMU-2009
Punjab MET-2003

Ans. (a) : Helianthus annuus is a day neutral plant. It is commonly grown as a crop for its edible oily seeds. Apart from cooking oil production, it is also used as livestock forage as bird's food.
Avena sativa- It is high in iron, zinc and manganese. It improves brain health, insomnia, stress, and physical and sexual performance.
Beta vulgaris- It is an edible plant of the Amaranthaceae family.

132. One set of a plant was grown at 12 hours day and 12 hours night period cycles and it flowered, while in the other set night phase was interrupted by flash of light and it did not produce flower. Under which one of the following categories will you place this plant?
(a) Long day (b) Darkness neutral
(c) Day neutral (d) Short day

CMC Ludhiana-2009
AFMC-2008
Manipal-2007

Ans. (d) : One set of a plant was grown at 12 hours day and 12 hours night period cycles and it flowered, while in the other set night phase was interrupted by flash of light and it did not produce flower. Such type of flower will be placed in short day plant categories.



133. What type of plants will flower when short photoperiods are followed by long photoperiods?
(a) Long-short day plants
(b) Short-long day plants
(c) Intermediate plants
(d) None of the above

AMU-2002

Ans. (b) : Short-long day plants will flower when short photoperiods are followed by long photoperiods. They require the periodic exposure of light less than the critical period to induce flowering. They usually flower during the seasons when the days are of short duration, such as during the summer or fall.

134. A long day plant flowers only if exposed to a light period
(a) more than its critical day length
(b) less than its critical day length
(c) equal to its critical day length
(d) slightly less than its critical day length

AMU-2001

Ans. (a) : A long day plant flowers only if exposed to a light period more than its critical day length. They usually flower during the seasons when the days are of long duration, such as during the early summer and late spring.

135. Rajaji National Park is situated in
(a) Tamil Nadu (b) Uttarakhand
(c) Asom (d) Karnataka

AMU-2015

Ans. (b) : Rajaji National Park is situated in Uttarakhand. It's wildlife includes Elephant, Tiger, Panther etc. It was established in 1983. It is named after C Rajagopalachari.

136. The flowers of Oxalis open during the day and close at night. Such type of movement is
(a) photonasty (b) nyctinasty
(c) phototropic (d) seismonastic

Manipal-2012

Ans. (a) : The flowers of Oxalis open during the day and close at night, such type of movement is known as photonasty. Oxalis triangular is commonly called false shamrock. Photonasty is the response of plants to the availability of light.

137. A sleep movement in plants is a nastic response, that occurs daily in response to :
(a) dark (b) light
(c) water (d) both a and b

Uttarakhand PMT-2004
Manipal-2004

Ans. (d) : A sleep movement in plants is a nastic response, that occurs daily in response to dark and light. In this case, plant close up their leaves and petals in response to the onset of darkness because it is a rather fast response. It does not involve differential growth but changes in cellular turgor. Nastic movement is the movement of a plant part in response to an external stimulus in which the direction of reaction is not dictated by the stimulus direction.
Thigmonasty
Movement of a part of plants in response to touch eg. Mimosa pudica, folds leaves and droops when touched. It is also known as Seismonasty

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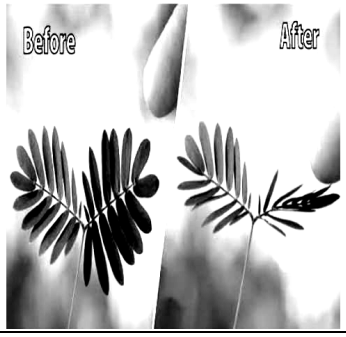

138. Which of the following control flowering in long day plants and sex expression in certain species?
(a) Auxin (b) Cytokinin
(c) Gibberellin (d) Ethylene

BHU PMT-2001

Ans. (c) : The Gibberellins control flowering in long day plants and sex expression in certain species Gibberella. It forms the basis of molecules such as vitamins A and E.

139. An example of short day plant is
(a) Wheat (b) Maize
(c) Chrysanthemum (d) Radish

J&K CET-2008

Ans. (c) : An example of short day plant is Chrysanthemum. They are native to East Asia and northeastern Europe. They are most popular fall garden flowers.

140. Which of the process Cholodny-Went theory is concerned with?
(a) Photomorphogenesis (b) Photoperiodism
(c) Phototropism (d) Photorespiration

J&K CET-2008

Ans. (c) : Phototropism process is concerned with Cholodny- Went theory. Phototropism of stem and roots are due to differential hormonal effect. Phytochromes detect light. They are sensitive to light of red and far-red wavelengths. It is used to control flowering times depending on the length of the day and night.

141. Opening and closing of flowers represent a kind of :
(a) nastic movement
(b) tropic movement
(c) mutation
(d) autonomic movement

HP CET-2011

Ans. (a) : Opening and closing of flowers represent a kind of nastic movement. The movement of a plant part in response to an external stimulus in which the direction of response is not determined by the direction of stimulus is known as a nastic movement.

142. In IUCN Red List (2004) documents, the extinction 784 species includes
(a) 335 vertebrates, 360 invertebrates and 89 plants
(b) 337 vertebrates, 362 invertebrates and 88 plants
(c) 338 vertebrates, 359 invertebrates and 87 plants
(d) 340 vertebrates, 357 invertebrates and 87 plants

J&K CET-2014

Ans. (c) : In IUCN Red List (2004) documents, the extinction 784 species includes 338 vertebrates, 359 invertebrates and 87 plants.
IUCN is the global authority on the status of the natural world and the measures needed to safeguard it. It is also known as Red Data Book.

143. Which of the following statements regarding photoperiodism is false?
(a) The response of plants to periods of light/day is termed photoperiodism
(b) The shoot apices cannot perceive photoperiods
(c) In day neutral plants there is no corelation between exposure to light duration and induction of flowering response
(d) Shoot apices modify themselves into flowering apices prior to flowering
(e) The site of perception of the light/dark duration is the flower

Kerala PMT-2015

Ans. (e) : Photoperiodism is a process that plant use to determine when to flower, there are some statements regarding photoperiodism.
(a) The response of plants to periods of light/day is termed photoperiodism.
(b) The shoot apices cannot perceive photoperiods
(c) In day neutral plants there is no corelation between exposure to light duration and induction of flowering response
(d) Shoot apices modify themselves into flowering apices prior to flowering
Hence, it is clear from above explanation that option (e) is false regarding to the question.

144. Importance of day length in flowering of plants was first shown in
(a) Lemna (b) tobacco
(c) cotton (d) Petunia

BHU PMT (Screening)-2010

Ans. (b) : Importance of day length in flowering of plants was first shown in tobacco. The reaction of the length of day and night on the flowering of the plants is known as photoperiodism. Photoperiodism was first studiesd by Garner and Allard (1920).
• They observed that "Maryland Mammoth" variety of tobacco could be made to flower in summer by reducing the light hours with artificial darkening.

145. Which one is a short day plant?
(a) Brassica campestris
(b) Raphamnus sativus
(c) Glycinemax
(d) Papaver somniferum

MGIMS Wardha-2008

Ans. (c) : Glycinemax is a short day plant. Short day plants are those plants that start flowering when the days are lower than their crucial day length. They compel a long interval of dusk and a short period of light to flower.

146. Plants flower in response to a certain ratio of light to dark in a day, which reflects seasonal changes. This response is known as:
(a) verbalization (b) photoperiodism
(c) photorespiration (d) photosynthesis

VMMC-2006

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Ans. (b) : Plants flower in response to a certain ratio of light to dark in a day, which reflects seasonal changes. This response is known as photoperiodism. It is the physiological reaction of organism to the length of night or a dark period. It happens in plants and animals. They are classified under their group. According to the photoperiods-
(i) Short day plants
(ii) Long day plants
(iii) Day neutral plants

147. Pigment involved in the perception of the photo periodic stimulus is :
(a) cytochrome (b) phytochrome
(c) chlorophyll (d) carotenoids

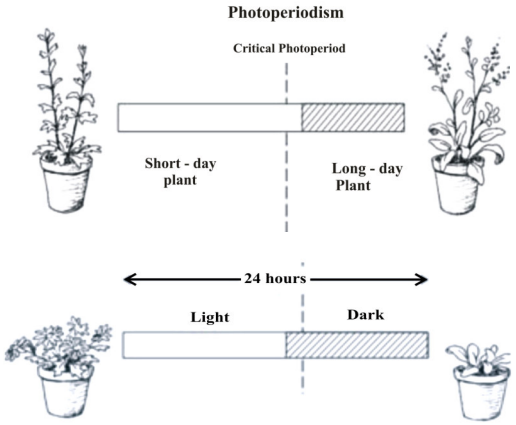
Rajasthan PMT-1998

Ans. (b) : Pigment involved in the perception of the photoperiodic stimulus is phytochrome. It is universally present in green flowering plants. It is mainly responsible for photomorphogenetic changes and development process in them.

148. The photoperiodic cycles of 6 hours of dark period and 18 hours of light period induce flower formation in:
(a) Xanthium (b) Tobacco
(c) Soybean (d) Beta

Uttarakhand PMT-2010
AP EAMCET-2003

Ans. (d) : The photoperiodic cycles of 6 hours of dark period and 18 hours of light period induce flower formation in Beta vulgaris plant.



149. Assertion (A) : Lettuce seeds are positively photoblastic.
Reason (R) : Gibberellin application effectively works as a substitute in darkness for germination.
The correct answer is:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

AP EAMCET-2004

Ans. (b) : Lettuce seeds are positively photoblastic. Gibberellin application effectively works as a substitute in darkness for germination.
Both A and R are true but R is not the correct explanation of A.

150. In photoactive plants, during daytime the following ionic flux of guard cell is directly involves the expenditure of energy
(a) outward movement of malate
(b) inward movement of K^+
(c) outward movement of protons
(d) inward movement Cl^-

Manipal-2015

Ans. (c) : In photoactive plants, during daytime the outward movement of protons ionic flux of guard cell is directly involves the expenditure of energy. Here ions goes in and out of the guard cells during stomatal closure and opening.

151. The effect of daily light period on flowering is called :
(a) photorespiration (b) phototropism
(c) photo-oxidation (d) photoperiodism

JIPMER-2001

Ans. (d) : The effect of daily light period on flowering is called photoperiodism. The length of day and night is known as photoperiod. Some plants need to be exposed to sunlight for a particular duration of time to induce flowering. The plants which require more exposure to light are called long day plants. Those plants which require less exposure to light is called short day plants.

152. Identify the plant in which 'night break' is inhibitory to floral induction:
(a) spinach (b) Xanthium
(c) beet (d) Hyoscyamus

AP EAMCET-2001

Ans. (b) : 'Night break' is inhibitory, to floral induction in Xanthium plant. Night break is a phenomenon seen in plants that are used to study the photoperiodic control of growth and flowering. Xanthium is a dicotyledon belonging to the Asteraceae family in the Angiospermae.

153. Stomata open during day because the guard cells have
(a) outer walls thin (b) kidney shape
(c) chlorophyll (d) large nuclei

CG PMT-2006

Ans. (c) : Stomata open during day because the guard cells have chlorophyll. Guard cells surround the stomata and helps in the opening and closing of the stomata. The stomata open due to swelling of guard cells and vice versa.

154. *Nicotiana sylvestris* flowers only during long days and *N. tabacum* flowers only during short days. If raised in the laboratory under different photoperiods, they can be induced to flower at the same time and can be cross-fertilized to produce self-fertile offspring. What is the best reason for considering *N. sylvestris* and *N. tabacum* to be separate species: -
(a) They cannot interbreed in nature
(b) They are reproductively distinct
(c) They are physiologically distinct
(d) They are morphologically distinct

AIPMT-2003

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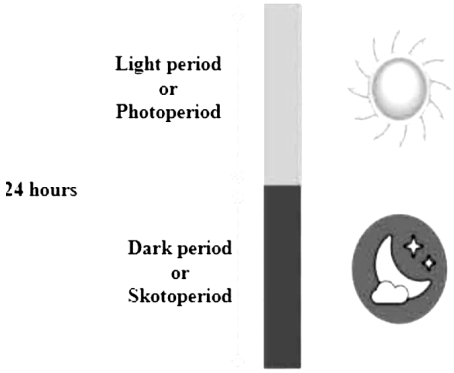
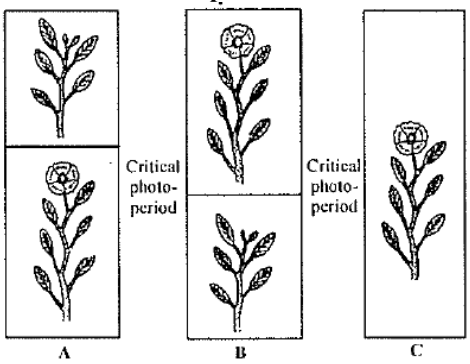
Ans. (a) : *Nicotina sylvestris* (long day plant) and *Nicotiana tabacum* (short day plant) have different photoperiods. Photoperiods are specific for each species. In nature, these plants cannot interbreed and thus make them cross breed.



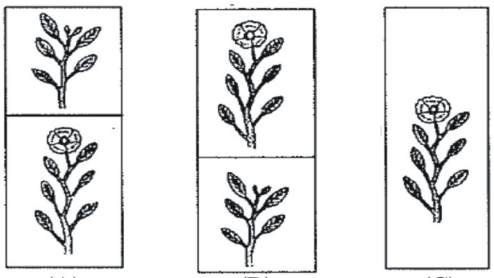
155. Refer the given figures on photoperiodism and select the correct option.



	A	B	C
(a)	No correlation between light period and flowering	Long light-exposure period	Short light-exposure period
(b)	Long light-exposure period	No correlation between and flowering	Short light-exposure period
(c)	Short light-exposure period	Long light-exposure period	No correlation between light period and flowering
(d)	No correlation between light period and flowering	Short light-exposure period	Long light-exposure period

AIIMS-2010

Ans. (c) :



(A) Short light exposure period. (B) Long light exposure period (C) No correlation between light period and flowering

(A) Short day plant requires longer duration of darkness and has less critical photoperiod.
(B) Long day plant requires shorter duration of darkness and has longer critical photoperiod.
(C) Day neutral plant which do not depend on the length of the photoperiod. They flower regardless of photoperiod.

156. Nicotiana sylvestris flowers only during long days and N. tabacum flowers only during short days. If raised in the laboratory under different photoperiods, they can be induced to flower at the same time and can be cross-fertilized to produce self-fertile offspring. What is the best reason for considering N. sylvestris and N. tabacum to be separate species?

(a) they cannot interbreed in nature
(b) they are reproductively distinct
(c) they are physiologically distinct
(d) they are morphologically distinct

AIIMS-2008

Ans. (a) : ***Nicotiana sylvestris*** and ***Nicotiana tabacum*** have different photoperiods. Photoperiods are specific for each species. In nature, these plants cannot interbreed and thus have to provide altered photoperiods and thus make them cross breed. These two species cannot reproduce freely. They are reproductively distinct.

157. The biological clock measures the length at each night by the:

(a) Relative amount of red absorbing and far-red absorbing phytochrome present at dawn
(b) Amount of far-red absorbing phytochrome at dusk
(c) Relative amount of red absorbing and far-red absorbing phytochrome at mid day
(d) Rate at which are kind of phytochrome is converted to the other

AIIMS-2015

Ans. (a) : The biological clock measures the length at each night by the relative amount of red absorbing and far-red absorbing phytochrome present.
Photoreceptors and biological clocks are universal mechanisms for sensing and responding to the light environment.
Exposure to red light converts the chromo protein to the functionally active form, while darkness converts the chromospheres to the inactive form.

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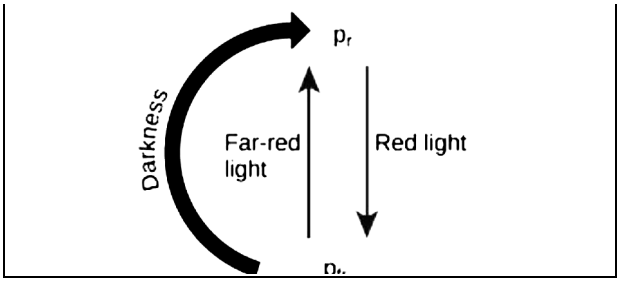

158. If a tree flowers thrice in a year (Oct, Jan and July) in Northern India. It is said to be
(a) photo and thermo-insensitive
(b) photo and thermo-sensitive
(c) photosensitive but thermo-insensitive
(d) theromosensitive but photo-insensitive

AIPMT-1997

Ans. (a) : If a tree flowers thrice in a year (October, January and July) in Northern India. It is said to be photo and thermo insensitive.

159. If a plant produces flowers when exposed only to alternating periods of 5 hours light and 3 hours dark in a 24 – hour cycle, then the plant should be a _____.
(a) Short day plant (b) Long day plant
(c) Short-long day plant (d) Day neutral plant

Karnataka CET-2014

Ans. (b) : If a plant produces flowers when exposed only to alternating periods of 5 hours light and 3 hours dark in a 24 – hour cycle, then the plant should be a long day plant.

160. Cytochrome is : -
(a) Metallo flavoprotein
(b) Fe containing porphyrin pigment
(c) Glycoprotein
(d) Lipid

AIPMT-2001

Ans. (b) : Cytochrome is iron containing hemeprotein. They contain iron porphyrin or copper porphyrin as prosthetic groups. Cytochrome accept and release an electron in electron transport chain.

161. Proteinaceous pigment which control the activities concerned with light : -
(a) Phytochrome (b) Chlorophyll
(c) Anthocyanin (d) Carotenoids

AIPMT-2001

Ans. (a) : Proteinaceous pigment which control the activities concerned with light is phytochrome. Phytochrome is a plant pigment that can detect the presence or absence of light and is involved in regulating many processes that are linked to day length (Photoperiod), such as seed germination and initiation of flowering.

162. What is true for photolithotrops : -
(a) Obtain energy from radiations and hydrogen from organic compounds
(b) Obtain energy from radiations and hydrogen from inorganic compounds
(c) Obtain energy from organic compounds
(d) Obtain energy from inorganic compounds

AIPMT-2001

Ans. (b) : Photolithotrops are those plants that obtain energy from radiation and hydrogen from inorganic compounds.
In other words, photolithotrops manufacture their own organic nutrients from inorganic material.

E. Plant hormones

163. Abscission of flowers and leaves is caused by
(a) ABA (b) Ethylene
(c) GA (d) Auxin

TS EAMCET 10.05.2023 Shift-I

Ans. (b) : The abscission, or the process of shedding flowers and leaves is primarily caused by plant hormone called ethylene. Ethylene is responsible for triggering the separation of these plants parts from the main stem. This natural process alloces plant to shed older or damage leases and flowers malting way for new growth.

164. Select the correct combination

	Role	Positive	Negative
I	Apical dominance	Auxin	Cytokinin
II	Seed germination	Ethylene	ABA
III	Seed dormancy	ABA	Ethylene
IV	Senescence	ABA	Gibberellin

(a) I and II (b) I, II and III
(c) III and IV (d) I, II, III and IV

TS EAMCET 10.05.2023 Shift-I

Ans. (d) : Apical dominance is regulated by the auxin. Auxin hormone has positive effect on apical dominance. Cytokinin is the hormone that promotes growth of lateral buds and also has negative effect on apical dominance.
- Ethylene is an important component of the gaseous environment, and regulates numerous plant developmental processes including seed germination and seedling establishment. ABA is inhibited the seed germination. ABA promotes seed dormancy.
- ABA plays a well characterized role in promoting seed and bud dormancy. Ethelene can break the dormancy of the seed and buds.
- Various plant hormones have been shown to be involved in regulating plant senescenece. For example Abscisic acid (ABA), ethylene and salicylic acid. Gibberellins slow down fruit ripening and senescence. It inhibit the nodule senescence.

Hence, (d) one is a correct answer.

165. Identify correct statements
(A) 2, 4-D used to kill dicotyledonous weeds
(B) Auxins promote flowering in Pine apple
(C) Ethyle reduces the respiration rate during ripening of fruits
(D) ABA – Initiate flowering in mango
(a) A and B are correct (b) B and C are correct
(c) C and D are correct (d) D only correct

TS EAMCET-11.05.2023, Shift-I

Ans. (a) : 2, 4 – D is a synthetic auxin that is used to kill dicotyledonous weeds. It is the hormone that promotes the growth of shoots and inhibits the growth of roots.
- Auxin promotes flowering in pineapple. Auxins are plants hormones that play a role in various process cell division and elongation. They also play a role in apical dominance, which is the tendency of apical bud to suppress the growth of lateral buds. In pineapples, auxins are applied to the growing point to induce flowering.

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166. Choose the correct combinations from the following

A. Induce sprouting of Potato tubers – Ethylene
B. Kill the dicot weeds – Cytokinin
C. Increase in Stalk length of grapes – Gibberellins
D. Induce apical dominance – Auxins

(a) A C D (b) B D C
(c) B C D (d) A B C

AP EAPCET-22.05.2023, Shift-II

Ans. (a) : Gibberelins are the plant hormones that induced sprouting of potato tubers. They do this by stimulating cell division and elongation in the buds, as well as the synthesis of enzymes that are need for growth.

- Gibberellins promote elongation of stems and stalks, which can lead to increased stalk length in grapes.
- Auxins are plant hormones responsible for controlling the growth of plants. They inhibit the growth of lateral buds, promoting apical dominance where the main stem goows stronger.

167. Match List-I with List-II

	List-I		List-II
(A)	**Auxin**	**(i)**	**Promotes female flower formation in cucumber**
(B)	**Gibberellin**	**(ii)**	**Overcoming apical dominance**
(C)	**Cytokinin**	**(iii)**	**Increase in the length of grape stalks**
(D)	**Ethylene**	**(iv)**	**Promotes flowering in pineapple**

Choose the correct answer from the options given below:

(a) (A)-(i), (B)-(iii), (C)-(iv), (D)-(ii)
(b) (A)-(iii), (B)-(ii), (C)-(i), (D)-(iv)
(c) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(d) (A)-(iv), (B)-(iii), (C)-(ii), (D)-(i)

RE-NEET (UG)-06.06.2023 (Manipur)

Ans. (d) : Plant hormones are naturally occurring organic substances which control morphological, physiological and biochemical responses at very low concentration.

- Cytokinin modifies apical dominance and promotes lateral bud growth.
- Gibberellin causes extension of stem due to cell elongation and not by cell division.
- Ethylene promotes formation of female flowers in cucumbers.
- Auxins promotes flowering in pineapple.

168. Spraying of which of the following phytohormone on juvenile conifers helps in hastening the maturity period, that leads to early seed production?

(a) Abscisic Acid
(b) Indole-3-butyric Gibberellic Acid
(c) Gibberellic Acid
(d) Zeatin

NEET (UG) 07.05.2023

Ans. (c) : Gibberellins are plant growth regulators that facilitate cell elongation and help the plant to grow taller.

- Gibberellines was first isolate by Teijiro yabuta sumuki form fungal strains provided by kurosawa from *Gibberella fujikori.*
- Yabuta named the isolate Gibberellin.
- Gibberellin is useful in early seed production in conifers.

169. Which hormone promotes internode/petiole elongation in deep water rice?

(a) 2, 4-D (b) GA_3
(c) Kinetin (d) Ethylene

NEET (UG) 07.05.2023

Ans. (d) : Ethylene is regarded as a multifunctional phytohormone that regulates both growth and senescence.

- It is a gaseous hormone.
- Ethylene promotes internode or petiole elongation in deep water rice plants.
- Ethylene is a natural product of metabolism in plants. It enhance the respiration rate during the ripening of fruits.

170. Name of a gaseous plant hormone is

(a) IAA (b) gibberellin
(c) ethylene (d) abscisic acid

Tripura JEE-2022
WB JEE-2009

Ans. (c) : The name of a gaseous plant hormone is ethylene. It belongs to a group of plant growth regulators that are commonly used to accelerate fruit ripening and enhance the number of blooms and fruits produced. It causes changes in texture, softness, color and other process in fruits by triggering a series of events.

171. Identify the correct combinations from the following:

A	**Terpenes**	**–**	**hastens malting process**	**–**	**2,4 D**
B	**Carotenoid derivatives**	**–**	**Stimulates the closure of stomata**	**–**	**ABA**
C	**Indole compounds**	**–**	**Increases the inter nodal length**	**–**	**IBA**
D	**A modified form of a purine**	**–**	**helps nutrient mobilization**	**–**	**Kinetin**

(a) A, B only (b) B, D only
(c) C, D only (d) B, C only

TS EAMCET-31.07.2022 Shift-II

Ans. (b) :
Terpenes - Terpenes are a large, diverse class of organic hydrocarbon compound produced by various plant, they play important role in plant defense against herbivore disease resistances.
Abscisic acid is a plant hormone that is use in many seed and but dormancy, and the control of organ size and stomata closure ABA is carotenoid derivatives
IBA – (Indole 3-butyric acid) it is a plant hormone in the auxin family. It regulate the root apical meristem size and lateral root development.
Kinetin - It is a modified form of adenine not a purine.
Kinetin used in a cell division on plant and is similar to kinin.

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172. Zn is essentially for _____

(a) Synthesis of fat
(b) Synthesis of auxins
(c) Synthesis of proteins
(d) Oxidation of carbohydrates

AP EAMCET-25.09.2020 Shift-II

Ans. (b) : Zn is essentially for synthesis of auxins. Zinc also serves in the control of plant growth through its indirect action on auxins. Zn affects the manufacturing of auxins and gibberellins at the same time supports the action that plant growth is influenced by a variety of growth components.

173. Match the Column-I and Column-II:

Column-I	Column-II
(i) Auxin	(A) Adenine derivatives
(ii) Gibberellin	(B) Carotenoid derivatives
(iii) Cytokinin	(C) Terpins
(iv) ABA	(D) Indole compounds

(a) i–B, ii–A, iii–D, iv–C
(b) i–D, ii–B, iii–A, iv–C
(c) i–B, ii–A, iii–C, iv–D
(d) i–D, ii–C, iii–A, iv–B

AIIMS-27.05.2018 Shift-I

Ans. (d) :
(i) Auxin → Indole compounds
(ii) Gibberellin → Terpins
(iii) Cytokinin → Adenine derivatives
(iv) ABA → Carotenoid derivatives

174. Which of the following statement is wrong about auxin?

(a) 2,4–D prevents the growth of dicot weeds
(b) 2,4–D prevents the growth of monocot weeds
(c) It promotes parthenoncarpy
(d) IAA is natural auxin

AIIMS-27.05.2018 Shift-I

Ans. (b) : Phytohormones are growth promoters of auxins. Indole acetic acid (IAA) is an auxin of a natural plant. Artificial auxins used as weedicides are 2,4,-D and 2,4,5-T. Also, naphthalene acetic acid (NAA) is a commonly used an artificial auxin in agriculture.

- 2,4- dichlorophenoxy acetic acid is synthetic auxin. It is widely used to remove broad leaved weeds or dicotyledonous weeds in cereal crops. It is also used to prepare weed-free lawns by gardeners.
- Auxin is applied to the indole-3- acetic acid (IAA) and to other natural and synthetic compounds having certain growth regulating properties. It also helps to initiate rooting in stem cuttings.

175. Cytokinin involves:

(a) Kinetin, zeatin, BAP (b) GA_3, IBA, Kinetin
(c) Zeatin, GA_3, BAP (d) IAA, Zeatin, Kinetin

AIIMS-26.05.2018 Shift-I

Ans. (a) : Cytokinins are of two types:-

- **Adenine-type cytokinins,** which are represented by kinetin, zeatin and 6- benzylaminopurine (BAP).
- **Phenylurea-type cytokinins,** which are represented by diphenylurea and thidiazuron (TDZ).
- GA_3 is another phytohormone, gibberellins. IBA and IAA are forms of auxin.

176. Which among the following belong to Auxin?

(a) IAA, IBA, CK (b) GA_3, 2,4-D, IAA
(c) IAA, IBA, NAA (d) 2,4-D, IAA, ABA

AIIMS-26.05.2018 Shift-II

Ans. (c) : Auxin is naturally occurring plant growth hormone it is produced at the tip of growing shoot and roots and promotes cell elongation.

- **IAA**- Indole -3-acetic acid is universal natural auxin.
- **IBA**- Indole-3- butyric acid with auxin like activity it is both naturally occurring and synthetically prepared.
- **NAA**- Napthalene acetic acid is a synthetic auxin.

177. Which of the following is wrong about ethylene

(a) Inhibit growth of root
(b) Ripening of fruits
(c) Elongation of stem in paddy
(d) Promote senescence of leaves and flowers

AIIMS-26.05.2018 Shift-II

Ans. (a) : Ethylene promotes senescence and abscission of plant organs, especially of leaves and flowers.

- It stimulates fruit ripening.
- It enhances the respiration rate during the ripening of the fruits.
- Ethylene is a phytohormone that regulates both growth and senescence.
- Ethylene promotes the elongation of the stem in paddy.
- Ethylene increases the speed of leaf and flower senescence.
- Ethylene inhibits lateral buds and causes apical dominance.

178. Pollen grains can be stored for several years in liquid nitrogen having a temperature of

(a) –120°C (b) –80°C
(c) –160°C (d) –196°C

NEET-2018

Ans. (d) : Pollen grains are stored in liquid nitrogen and the temperature of liquid nitrogen is – 196ºC.

- The pollen grain stored for several years, and later used in plant breeding techniques.
- Cryopreservation is the process of presenting and storing cells, tissue, organ or any outer biological material from any potential damage by maintaining the material at very low temperature.

Nitrogen maintain the energy efficiency and providing an environmental friendly approach.

179. Regulation to restrict the movement of diseased plant material from one place to another are called :

(a) plant regulations (b) plant quarantine
(c) plant protection (d) crop rotation

Manipal-2003

Ans. (b) : Regulation to restrict the movement of diseased plant material from one place to another are called plant quarantine. The purpose and intent of this act is to prevent the introduction of insect, fungus, or other pest which is destructive to crops. The National Plant Quarantine Station is at Rangpuri, New Delhi etc.

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180. Which of the following movements in plants is not related to change in auxin level ?
(a) Nyctinastic leaf movement
(b) Movement of root towards soil
(c) Movement of sunflower, tracking the direction of sun
(d) Movement of shoot towards light

Haryana PMT-2004
Manipal-2003

Ans. (a) : Nyctinastic leaf movement in plants is not related to change in auxin level. It is a movement of leaves of many species from nearly horizontal leaves during the day and nearly vertical at night. These movements are controlled by biological clock, while the other conditions bending of shoot towards soil and movement of sunflower head tracking the sun are the condition related to auxins.

181. Gibberellins cause :
(a) shortening of genetically tall plants
(b) elongation of genetically dwarf plants
(c) promotion of rooting
(d) yellowing of young leaves

BVP-2005
Haryana PMT-2004
Manipal-2003

Ans. (b) : Gibberellins cause elongation of genetically dwarf plants. They are phytohormones which bring about cell elongation of mainly the stem. Gibberellins are formed by the young leaves of buds, root tips, developing seeds and promotes their growth and development. Genetically dwarf plants grow to normal size on the application of gibberellins. So gibberellins cause elongation of dwarf plants.

182. The micro element required for the synthesis of IAA is represented in its ionic form as a cofactor in this enzyme:
(a) Catalase (b) PEP carboxykinase
(c) Carbonic anhydrase (d) Nitrogenase

AP EAMCET-2002

Ans. (c) : The micro element required for the synthesis of IAA is represented in its ionic form as a cofactor in carbonic anhydrase. It catalyses the hydration of carbon dioxide into bicarbonate ions and protons. Zinc metal acts as a co-factor for this enzyme. Zinc is also the microelement required for the synthesis of indole acetic acid (IAA). IAA present in its ionic state as Zn^{2+}.

183. Removal of apical (terminal) bud of a flowering plant (or pruning of a flowering plant) leads to
(a) formation of new apical buds
(b) formation of adventitious roots on the cut side
(c) early flowering (or stopping of floral growth)
(d) promotion of lateral branches

Haryana PMT-2010

Ans. (d) : Removal of apical (terminal) bud of a flowering plant (or pruning of a flowering plant) leads to promotion of lateral branches. The apical bud when present does not allow the growth of auxiliary or vegetative buds this phenomenon is known as apical dominance. It is widely used in tea plantation and hedge making.

184. Coconut milk (coconut water) is widely used in tissue culture because it contains
(a) auxins (b) ethylene
(c) cytokinin (d) gibberellins

Haryana PMT-2010
AFMC-2007

Ans. (c) : Coconut milk (coconut water) is widely used in tissue culture because it contains cytokinin. It taste sweet and nutty. It contains easily digested carbohydrates in the form of sugar and electrolytes. It has fewer calories less sodium and more potassium than sports drink. Coconut water is most beneficial for adults and kids.

185. The reason for apical dominance is:
(a) ethylene (b) auxin
(c) cytokinin (d) gibberellins

Haryana PMT-2006

Ans. (b) : The reason for apical dominance is auxin. It occurs when the apical buds dominate and inhibit the growth of the lateral auxiliary buds. This result in the plant becoming long and leggy. This phenomenon is caused by auxin which is released from the shoot tip.

186. Thigmotropism occur due to the :
(a) light (b) contact
(c) temperature (d) pressure

Haryana PMT-2006

Ans. (b) : Thigmotropism occur due to the contact. It is one example of tropism, which is the response of a plant to environmental stimuli by growing towards or away from them.
Phototropism:- The action of a plant turning towards or away from light.

187. Which plant hormone promotes seed, bud dormancy and causes stomatal closure?
(a) IAA (b) Abscisic acid
(c) GAI (d) Cytokinin

Haryana PMT-2006

Ans. (b) : Abscisic acid hormone promotes seed, bud dormancy and causes stomatal closure. It is a growth inhibitor that retards or suppresses growth and metabolism. It is also known as stress hormone. Abscisic acid stimulates the closures of the stomata in the epidermis and increases the tolerance of plants to various kinds of stresses.

188. Multiple shoots are produced in meristem culture because the culture medium contains
(a) cytokinin for overcoming apical dominance
(b) auxin for proliferation of meristem
(c) auxin for overcoming apical dominance
(d) GA_3 for proliferation of meristem

CMC Vellore-2007

Ans. (a) : Multiple shoots are produced in meristem culture because the culture medium contains cytokinin overcoming apical dominance. Cytokinin represents a second messenger for auxin signaling in regulating bud activity. The plant hormones auxin and cytokinin are critical for plant regeneration in tissue culture with cytokinin playing on instrumental role in shoot organogenesis. Meristem is a type of tissue that are capable of cell division. Cells in the meristem can develop into all other tissue and organs that occur in plants.

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189. A good example of an auxin type herbicide is:

(a) IAA (b) NAA
(c) 2, 4-D (d) IBA

AP EAMCET-1997

Ans. (c) : A good example of an auxin type herbicide is 2, 4-D. Auxin like indole-3-acetic acid (IAA) and indole 3- butyric acid (IBA) are isolated from plants. 2, 4-D is known to be the one among the oldest and also most generally available herbicides and commercially available since 1945, and 2, 4-D are synthetic auxins.

190. Morphogenesis is controlled by an interaction between

(a) auxins and gibberellins
(b) auxins and cytokinins
(c) gibberellins and cytokinins
(d) None of the above

CG PMT-2011

Ans. (b) : Morphogenesis is controlled by an interaction between auxin and cytokinin. It plays an important role in the growth and differentiation of cultured cells and tissue. Morphe means to shape and genesis means creation. So morphogensis is a process that causes an organism to develop its shape. In plants it happens during cell division, cell extension and cell separation.

191. First natural cytokinin was discovered by

(a) Skoog and Miller (b) Letham
(c) Benson and Calvin (d) Thimann and Went

BVP-2012

Ans. (a) : First natural cytokinin was discovered by Skoog and Miller. The first cytokinin discovered was an adenine derivative named kinetin which was isolated as a DNA degradation product.

192. Which of the following type of phytohormones, resemble the nucleic acids in some structural aspects:

(a) cytokinin (b) auxins
(c) gibberellins (d) abscisic acid

AP EAMCET-2000

Ans. (a) : Cytokinin phytohormones, resemble the nucleic acids in some structural aspects. Cytokinin also helps in promoting cell division and increase the production of crops. It plays a major role in plant photogenesis by inducing resistance against certain disease causing bacteria. Cytokinin are chemically derivatives of adenine i.e. purine.

193. Synchronous flowering in pine apple can be achieved by the application of:

(a) kinetin (b) 2, 4,D
(c) abscisic acid (d) NAA

AP EAMCET-2000

Ans. (d) : Synchronous flowering in pineapple can be achieved by the application of NAA. It is an organic compound that is soluble in organic solvent and is a colorless solid. It does not occur naturally and its toxic to plants at higher concentrations, like all auxins. It is also used for the vegetative propagation of plants from stem and leaf cutting. It is used for tissue culture of plants.

194. Study the following lists.

List - I	List - II
A. Zacharias Janssen	1. Sexual reproduction
B. Camerarius	2. Conduction of water
C. Stephen Hales	3. Compound mircoscope
D. Knoll and Ruska	4. Crystallisation of urease
	5. Electron microscope

(a) A-5 B-2 C-4 D-3
(b) A-3 B-1 C-2 D-5
(c) A-2 B-4 C-1 D-3
(d) A-5 B-2 C-3 D-1

Manipal-2010

Ans. (b) :
A- Zacharias Janssen → Compound microscope
B- Camerarius → Sexual reproduction
C- Stephen Hales → Conduction of water
D- Knoll and Ruska → Electron microscope

195. The following statements are given about plant growth hormones.

I. Kinetin is a degradative substance from DNA molecule
II. ABA is present, in all the plants
III. Low ratio of cytokinins to auxins favours root formation only
IV. ABA is synthesised catabolically through mevalonate pathway.

The correct combination is

(a) I and II (b) II and III
(c) I and III (d) III and IV

Manipal-2010

Ans. (c) : The following statements are given about plant growth hormones are- I. Kinetin is a degradative substance from DNA molecule.
III. Low ratio of cytokinins to auxins favours root formation only.

196. Function of ABA is

(a) apical dominance (b) growth inhibition
(c) cell division (d) seed germination

AFMC-2010

Ans. (b) : Function of ABA is growth inhibition.
• It induces dormancy in bud, tubers and many seeds.
• It prevent the water loss during drought condition by closing the stomata.

197. 6-furfuryl amino purine, 2, 4-dichloro phenoxy acetic acid and indole 3-acetic acid are

(a) kinetin, synthetic auxin and natural auxin
(b) natural auxin, gibberellin and kinetin
(c) synthetic auxin, kinetin and natural auxin
(d) gibberellin, natural auxin and kinetin

CMC Ludhiana-2010

Ans. (a) : 6-furfuryl amino purine, 2, 4-dichloro phenoxy acetic acid and indole 3-acetic acid are kinetin, synthetic auxin and natural auxin. It is a synthetic auxin hormone which acts as weedicide. It is the most common naturally found auxin hormone in plants.

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198. Which of the following is not an influence of auxins?
(a) Apical dominance (b) Parthenocarpy
(c) Tropic movements (d) Bolting
CMC Ludhiana-2008

Ans. (d) : Bolting is not an influence of auxins. We know that auxin is a plant growth promoter has many functions. They promote apical dominance. Auxin helps to promote flowering. It can also be used as a weedicide. Auxin helps in differentiation of xylem and helps in cell division.

199. Auxin was first named by
(a) C Darwin (b) FW Went
(c) Alexopoulos (d) KV Thimann
MGIMS Wardha-2013

Ans. (b) : Auxin was first named by F.W. Went.
• Auxin is a plant hormone produced in the stem tip that promotes cell elongation it moves to the darker side of the plant.
• Auxin diffused out from the tip of oat coleoptiles in the gelatin block.

200. Genetic dwarfism can be overcome by
(a) gibberellin (b) ethylene
(c) auxin (d) ABA
JIPMER-2013

Ans. (a) : Genetic dwarfism can be overcome by gibberellin. When it is used on a dwarf plant the length of the internode increases. This increase results in the plant growing taller.

201. Which of the following is not an auxin?
(a) IAA (b) IBA
(c) Zeatin (d) NAA
JIPMER-2013

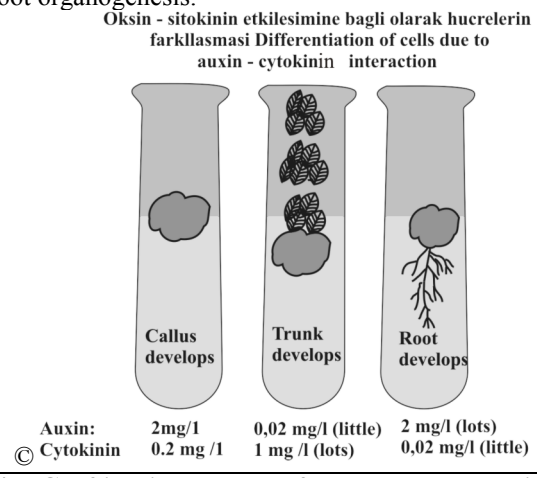
Ans. (c) : Zeatin is not an auxin.
• IAA is an auxin from a natural plant.
• NAA is commonly used artificial auxin in agriculture.
• IBA is most used synthetic auxins in plant propagation.

202. Plant hormones are:
(a) Growth regulators (b) Growth promoters
(c) Growth inhibitors (d) All of these
Manipal-2004
Uttarakhand PMT-2003

Ans. (d) : Plant hormones are growth regulator, growth promoters and growth inhibitors for their survival and growth plants require a lot of natural aid like water, oxygen. Sunlight and various minerals and nutrients. All these are externals factors that help in the development of plants. Plants hormones help in regulating the growth of plants. Hormones play a very important role in a plant's body and facilitate processes like vernalisation, dormancy ect.

203. Hormone used in tissue culture for better growth is : (1) auxin (2) gibberellin (3) cytokinin (4) vernalin
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct
BHU PMT (Mains)-2005

Ans. (d) : Hormone used in tissue culture for better growth is auxin and cytokinin. The phytohormone auxin and cytokinin are critical for plant regeneration in tissue culture, with cytokinin playing an instrumental role in shoot organogenesis.



204. Grafting is employed for a better and quicker yield of varieties of : (1) apple (2) mango (3) citrus (4) tea
(a) 1, 2 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 4 are correct
(d) 1 and 3 are correct
BHU PMT (Mains)-2005

Ans. (a) : Grafting is a type of vegetative propagation in plants. It is employed for a better and quicker yield of good varieties of plants that take years to produce fruits some common plants that can be grown by grafting include apple, mango and citrus.
• Grafting is especially successful in dicotyledonous plant, where the stem has a cambium layer.

205. The non-auxin herbicide which is used to kill broad leaved plants in grass lawns is :
(a) diquat (b) dinitrophenol
(c) dalapon (d) dicamba
BHU PMT (Mains)-2005

Ans. (c) : The non-auxin herbicide which is used to kill broad leaved plants in grass lawn is dalapon. Herbicides are chemical compounds that are used for the destruction of plant pests. These compounds are toxic to weeds only. They do not affect the growth of plants. Dalapon is an example of non-auxin herbicide that acts as a growth regulator of particular perennial and annual grasss.

206. Which of the following is correct?
(a) 99% of existed species are extinct
(b) 25% of existed species are extinct
(c) 40% of existed species are extinct
(d) 30% of existed species are extinct
Uttarakhand PMT-2004

Ans. (a) : 99% of existed species are extinct. Around 99% of all species which amounts to over 5 billion. Extinction and endangerment rates are higher than normal and with nonsensical habitat destruction those numbers will only continue to grow.

207. Phytochrome occurs in two forms. In which form it promotes the germination of seeds of some species?
(a) P_{fr} forms (b) P_r forms
(c) Both forms (d) None of these
MGIMS Wardha-2004

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Ans. (a) : Phytochrome occurs in two forms P_{fr} form promotes the germination of seed of same species. It exists in two interconvertible forms, the red light - absorbing form (P_r) and the far- red light - absorbing form (P_{fr}). Phytochrome plays a crucial role in seed germination, stem elongation, leaf expansion and flowering time.

208. A ripe mango, kept with unripe mangoes causes their ripening. This is due to the release of a gaseous plant hormone

(a) Auxin (b) Cytokinin
(c) Gibberellin (d) Ethylene

KVPY SB & SX-2012

Ans. (d) : A ripe mango, kept with unripe mangoes causes their ripening. This is due to the release of a gaseous plant ethylene hormone.

Gibberellin:- Gibberellin are endogenous plant growth regulators, having tetracyclic, diterpenoid compounds.

209. One of the preventive methods of fruit drop is by spraying

(a) Auxin (b) Ethylene gas
(c) Gibberellins (d) Cytokinin

CG PMT-2007

Ans. (a) : One of the preventive methods of fruit drop is by spraying auxin.

210. Substances, which originate at the tip of stem, root and control the growth of different organs are

(a) Enzymes (b) Hormones
(c) Vitamins (d) Food substances

CG PMT-2007

Ans. (b) : The substances that are produced at the root tip of the stem and control the development of various organs are hormones. Plant hormones are chemical compounds presents in very low concentration in plants. They are produced in almost all parts of the plant and are transmitted to various parts of the plant. Hormones play an important role in the process like seed germination, phototropism etc.

211. Climacteric fruit shows:

(a) High respiration rate at ripening
(b) Sudden change in taste
(c) Sudden change in colour & shape
(d) None of the above

Uttarakhand-2005

Ans. (a) : Climacteric fruit shows high respiration rate at time of ripening. They have special characteristics that help them ripe even after harvesting is due to the large amount of ethylene produced in them along with high respiratory activity. They do not require remaining on the tree for their ripening. Citrus groups are the examples of the non-climacteric fruits and ripe without ethylene.

212. A phytohormone which increases the production of starch hydrolyzing enzymes during the germination of maize seeds, is employed of the following:

(a) Increasing the vase-life period of flowers
(b) Induction of seedless fruits in grapes
(c) Acceleration of ripening of banana fruits
(d) Eradication of dicot weeds

AP EAMCET-2003

Ans. (b) : A phytohormone that increases the production of starch hydrolyzing enzymes during the germination of maize seeds is employed of induction of seedless fruits in grapes. It is also responsible for the production of seedless fruit in grapes and tomatoes. Gibberellins is responsible for that mechanism or process. Hence, it is clear that option (b) is correct answer.

213. The phytohormone which increases the concentration of potassium in guard cells is also responsible for the induction of:

(a) Apical dominance
(b) Triple response growth
(c) Cell division
(d) Abscission

AP EAMCET-2004

Ans. (c) : Phytohormone which increase the concentration potassium in guard cells is also responsible for the induction of cell division. Plant hormones are chemical substances that regulate various aspects of plant growth and development.

Phytohormone are produced in one region and carried to the site of action through diffusion, xylem vessels, plant hormones are required in very small concentration to bring their action. Such as auxin is a growth promoting hormone that promotes cell division, cell differentiation, and apical dominance.

214. Pruning of plants promotes branching because the axillary buds get sensitized to :

(a) Ethylene (b) Gibberellin
(c) Cytokinin (d) Indole acetic acid

Haryana PMT-2004

Ans. (c) : Pruning of plants promotes branching because the auxiliary buds get sensitized to cytokinin. They are a class of plant growth substance that promote cell division. They are involved primarily in cell growth and leaf senescence.

Directions: In the following question more than one of the answers given may be correct. Select the correct answer and mark it according to the code:

215. Which of the following statement is correct ?

(1) The causal organism for foolish seedling disease is the source of gibberellin
(2) Abscisic acid is a growth promoter
(3) The ratio of auxin to cytokinin control cell differentiation
(4) Bolting of cabbage can be induced by treatment with IAA

(a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

BHU PMT (Mains)-2008

Ans. (d) : Gibberellin is responsible for the foolish seedling disease of rice.

- Abscisic acid is a growth inhibiting hormone. It inhibits or suppresses the growth of plants.
- If cytokinins and auxin are present in equal amount, the cell divide but fail to differentiate. Thus they control cell differentiation.
- Cabbage bolting can be induced by gibberellins.

216. 'Richmond Lang effect' deals with:

(a) Parthenocarpic fruit formation by auxins
(b) Foolish seedling disease by gibberellins
(c) Delay in senescence by cytokinins
(d) Closure of stomata by abscisic acid

AP EAMCET-2001

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Ans. (c) : The Richmond Lang effect deals with delay in senescence by cytokinins. They have a special effects on cytokinesis. It is synthesized in areas of rapid cell division. It helps to produce new leaves, chloroplast in leaves, shoot growth etc. They are phytohormones that can inhibit plant senescence by promoting cell division.

217. The presence of auxins in a solution could be tested by

(a) Avena sativa stem tip test
(b) Carbon tetrachloride test
(c) Iodine test
(d) Defoliation test

CG PMT-2006

Ans. (a) : The presence of auxins in a solution could be tested by Avena sativa stem tip test. Tips were placed on agar-block for some hours. This ensured the diffusion of auxins from the tips to the agar layer. Auxin is a class of plant growth regulators that are either indole derivatives or acetic acid derivatives. Thus, from the step tip test the presence of auxins in the solution can be detected.

218. Bakanae disease in rice plants is caused by

(a) NAA (b) 2, 4-D
(c) GA (d) IAA

VMMC-2011

Ans. (c) : Bakanae disease in rice plants is caused by gibberellic acid (GA). The appearance of symptoms of the disease in rice seedlings was reported when gibberellins were treated with sterile filtrates of the fungus. The active substances was later identified as gibberellic acid.

219. In callus culture, roots can be induced by supply of

(a) Auxin (b) Cytokinin
(c) Gibberellins (d) Ethylene

VMMC-2011

Ans. (a) : In callus culture, roots can be induced by supply of auxin. This culture is a tissue culture technique in which a complete plant grows from a single cell or tissue. The cell is kept in a medium rich in nutrients.

220. The alkaloid used for induction of polyploidy, is

(a) Auxin (b) Kinetin
(c) Ethylene (d) Colchicines

VMMC-2011

Ans. (d) : The alkaloid used for induction of polyploidy, is colchicines. Alkaloid is one of the secondary metobolites that contain one nitrogen atom. They have diverse physiological effects on organisms, some of the alkaloids induced are morphines, quinine, nicotine, strychnine, and ephedrine. Colchicine is alkaloids four in *Colchicum autumnale* plants that involve in the induction of polyploidy in plants.

221. One hormone hastens maturity period in juvenile conifers, a second hormone controls xylem differentiation, while the third hormone increases the tolerance of plants to various stresses. They are respectively

(a) Gibberellin, Auxin, Ethylene
(b) Auxin, Gibberellin, Cytokinin
(c) Gibberellin, Auxin, ABA
(d) Auxin, Gibberellin, ABA

AIIMS-2016

Ans. (c) : Spraying juvenile conifers with gibberellins hastens their maturity period, thus leading to early seed production.

- **Auxin** is a plant hormone produced in the stem tip that promotes cell elongation by controlling xylem differentiation.
- The plant hormone **ABA** is the major role player in mediating the adaptation of the plant to stress.

222. ABA is involved in

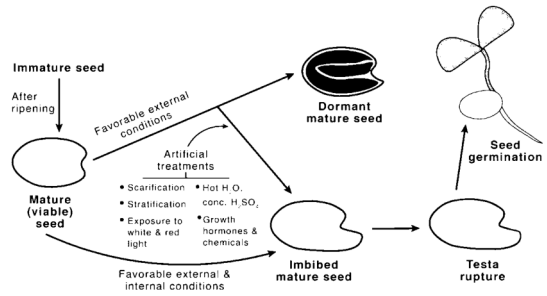
(a) Shoot elongation (b) Increased cell division
(c) Dormancy clock (d) Root elongation

AIIMS-2014

Ans. (c) ABA also helps in preventing the loss of dormancy of seed.

- Seed germination is inhibited by ABA which is antagonist to gibberellin.
- ABA also helps in the inhibition of the division of cells in the vascular cambium.
- The plant genes for ABA biosynthesis and sequence of the pathway have been explained.
- ABA plays a central role in induction and maintenance of seed dormancy and also inhibits the transition from embryonic to germination growth.

Seed Dormancy



223. Leaf fall occurs in tree when there is an increase in the concentration of ……..

(a) Auxins (b) Abscisic acid
(c) Cytokinins (d) Gibberellins

Karnataka CET-2005

Ans. (b) : The increases in the concentration of abscisic acid is responsible for leaf fall. Abscisic acid is a plant growth inhibitor hormone. The low amount of auxin hormone in a plant, results of in the falling of the leaves of the plant.

224. Which part would be most suitable for raising virus-free plants for micropropagation?

(a) Meristem (b) Node
(c) Bark (d) Vascular tissue

AIPMT (Screening)-2012

Ans. (a) : When plant breeders regenerate virus infected plants they often collect the meristem (specially apical meristem) from the infected plant and cultivate it in appropriate media to develop virus-free plantlets.

Meristem is localized group of cells which are actively dividing and undifferentiated but ultimately give rise to permanent tissue. Although plant is infected with a virus yet the meristem is free of virus.

High concentration of auxin and cytokinin hormone high frequency of cell multiplication and small size of plasmodesmata prevent the movement of the virus from one cell to another cell.

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225. Out of the following which is a genetically engineered antiviral protein ?
(a) Humulin (b) Interferon
(c) Fumagillin (d) Griseofulvin
Punjab MET-2007

Ans. (b) : Interferon - Viral infected cell are produced interferon at this it is also called the antiviral protein.

226. The chemical which are produced by host plants due to infection as a defence reaction to pathogen, are called :
(a) phytotoxin (b) toxin
(c) phytotron (d) phytoalexins
Punjab MET-2006

Ans. (d) : Phythoalexins are chemical which are produced by host plant due to infection as a defense reaction to pathogen. Actually it produced by plant by microorganism or by naturally occuring chemical reaction.
Phytol is the side chain in chlorophyll.
Phytotoxin are substance that are toxic to plant growth.
Toxin - The poisonous substance which are produce by bacteria and plant, animal called toxin.
Phytotron - Phytotron help to studies of the response of plant to their environment.

227. Elevated blood levels of certain enzymes suggest a related disease. Match the enzyme in column I with related disease in column II.

	Column - I		Column –II
A.	Amylase	1.	Liver disease
B.	Glutamate dehydrogenase	2.	Myocardial infarction
C.	Alkaline phosphatase	3.	Liver or bone disease
D.	Creatine kinase	4.	Pancreatic disease

Codes
(a) A-1 B-2 C-3 D-4 (b) A-4 B-3 C-2 D-1
(c) A-3 B-4 C-1 D-2 (d) A-4 B-1 C-3 D-2
MGIMS Wardha-2015

And : (d)

	Enzyme		Diseases
A.	Amylase	4.	Pancreatic disease
B.	Glutamate dehydrogenase	2.	Liver disease
C.	Alkaline phosphatase	3.	Liver or bone Disease
D.	Creatine kinase	4.	Myocardial infarction

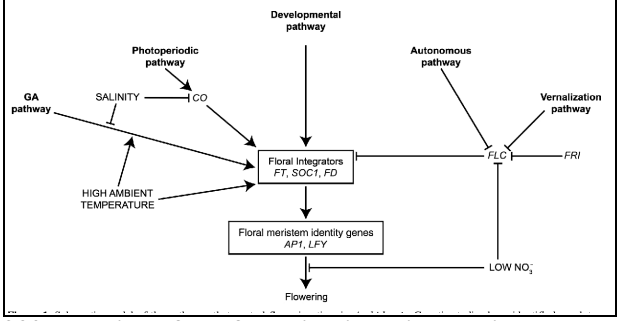
228. Endopeptidase of plant kingdom is
(a) Trypsin (b) Pepsin
(c) Papain (d) Urease
Punjab MET-2011

Ans. (c) : Endopeptidase are a group of hydrolase which catalyze the hydrolysis of peptide bonds and the break of non terminal acid.
One example of endo peptidase pepsin obtained from the latex of papaya fruit.
Pepsin-it is produced in the gastric chief cell of the stomach.
It breakdown protein into smaller peptides.
Trypsin - A digestive enzyme which break down protein in the small intestine.
Ureases - It is found in numerous bacteria fungi, algae, plant and some invertebrates.

F. Plasticity

229. Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called
(a) Maturity (b) Elasticity
(c) Flexibility (d) Plasticity
NEET-2021

Ans. (d) : The ability of an organism to change its phenotype in response to different environment, termed plasticity, is a particularly important characteristic to enable sessile plants to rapid changes in their surroundings.
Elasticity is deforming and reforming without losing energy.
Flexibility bending of plant without break.
Maturity is when plant become to harvested.



230. Which of the following is an innovative remedy for plastic waste?
(a) Electrostatic precipitator
(b) Burning in the absence of oxygen
(c) Burying 500 m deep below soil surface
(d) Polyblend
NEET (Odisha)-2019

Ans. (d) : Polyblend is an innovative remedy of plastic waste. Polyblend is mixed with the bitumen that is used to lay roads.
- The blends of polyblend and bitumen, enhanced the bitumen's water repellent properties, and helped to increase road life by this factor.
- Plastic waste and pollution are now threatening the health and well being of humans and ecosystems the world over.

231. A plant species when grown in shade tends to produce thinner leaves with more surface area, and when grown under abundant sunlight starts producing thicker leaves with reduced surface area. This phenomenon is an example of
(a) Character displacement
(b) Phenotypic plasticity
(c) Natural selection
(d) Genotypic variation
KVPY SB & SX-2019

Ans. (b) : A plant species when grown in shade tends to produce thinner leaves with more surface area, and when grown under abundant sunlight starts producing thicker leaves with reduced surface area. This phenomenon is an example of phenotypic plasticity.

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232. A plant bearing different type of leaves is called:
(a) heterophylly (b) heterotrophy
(c) heterozygosity (d) heteronasty
Haryana PMT-2006

Ans. (a) : A plant bearing different type of leaves is called heterophylly. It is the development of different leaf forms in a single plant depending on the environmental conditions. It is observed in amphibious aquatic plants that can grow under both aerial and submerged condition.

233. Which type of movement is present in Mimosa pudica?
(a) Nyctinastic (b) Seismonastic
(c) Chemonastic (d) Phototrophic
Rajasthan PMT-2006, 1998

Ans. (b) : Seismic movement is present in Mimosa pudica. The extent of the seismonastic movement depends upon factors like the intensity of the stimulus, the vigor and age of the plant and therefore the time elapsed since the last stimulus.
The non directional movement of a plant part in response to an external stimulus is known as a nastic movement to the stimulus that is attained by the plant can be in the form of biological, electrical, chemical touch etc.

234. A sleep movement in plants is a nastic response, that occurs daily in response to
(a) dark (b) light
(c) water (d) both (a) and (b)
AMU-2005

Ans. (d) : Nyctinasty is the proper name for the "sleep movement of leaves" is a well know example of a nastic response.
In this, plants close up their leaves and petals in response to the one set of darkness by changes in cellular turgor.

235. Which of the following movement is induced by injury ?
(a) Aerotropism (b) Geotropism
(c) Tromonasty (d) Traumatropism
AMU-2003

Ans. (d) : Traumatropism is the growth response a pound or the growth movement of the plant as result of injury.
Unilateral injury to the tip of a root produce negative traumatropism that is bending of the root in a opposite direction to the injured side. Unilateral injury the shoot apex produce positive traumatropism that is bending in toward direction of the injury.

236. Thermonastic movement is related to
(a) High temperature (b) Light
(c) Touch (d) Chemicals
UP CPMT-2013

Ans. (a) : Response of plant movement related to temperature is called thermonastic movement
Response to light – photonastic movement
Response to touch – thigmonastic movement
Response to chemical – chemonastic movement.

237. Opening and closing of lowers represent a kind
(a) nastic movement (b) tropic movement
(c) mautation (d) autonomic movement
BVP-2003

Ans. (a) : Opening of flower is example of the epinesty. In the epinesty a plant part bent outward to inward. Epinastic process found in nastic movement. This movement is response to the direction of stimulus that meance opening and closing of flower in response to light and darkness is called photonasty.
Tropic movement – Movement of plant response to environmental stimuli
Autonomic movement – If the movement of plant found without any external stimuli spontaneously called the autonomic movement or autonomous movement.

238. When an animal turns sideways to the Sun to get the maximum amount of Sun on its flanks, this is an example of :
(a) motivation (b) habitation
(c) posture (d) orientation
BVP-2008

Ans. (d) : Orientation refers to the ability of an organism to direct its position and movement in space in relation to gravity and external stimulus like heat.

G. Vernalisation and seed dormancy

239. Treatment of seed at low temperature under moist conditions to break its dormancy is called
(a) scarification (b) vernalization
(c) chelation (d) stratification
JCECE-2014, 2013, 2009
CMC Ludhiana-2009
AFMC-2008 / AIPMT-2006

Ans. (d) : Treatment of seed at low temperature under moist conditions to break its dormancy is called stratification. It is the process of breaking of dormancy it involves the treatment of seeds at low temperature (5–10ºC) under sufficiently moist conditions to break its dormancy and induce germination.

240. Hormone replacing the requirement vernalization is
(a) ethylene (b) auxin
(c) gibberellins (d) cytokinin
CMC Vellore-2009 / UPCPMT-2009
Rajasthan PMT-2009 / Punjab MET-2009

Ans. (c) : Hormone replacing the requirement vernalization is gibberellins.

241. Asseriton (A): Vernalization is seen in Biennials
Reason (R): Cold treatment stimulate photo periodic flowering response in cabbage.
(a) Both A and R are correct. R is the correct explanation of A.
(b) Both A and R are correct, but R is not the correct explanation of A.
(c) A is correct but R is incorrect.
(d) A is incorrect but R is correct.
AP EAPCET-23.05.2023, Shift-II

Ans. (a) : Vernalization is a process by which plants are induced to flower by exposure to cold temperatures. Biennials are plants that require a period of vernalization before they can flower.
• The cold treatment that is given to cabbage plants to induced flowering is a type of photoperiodim. Photoperiodim is the response of plants to the length of day and night. In the case of cabbage, the cold treatment stimulates the shorts days of winter, which triggers the plants to flower.

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242. Inhibitory substances in dormant seeds cannot be removed by subjecting seeds to:
(a) Chilling conditions (b) Gibberellic acid
(c) Nitrate (d) Ascorbic acid

NEET-2020 Phase-II

Ans. (d) : Seed dormancy can be prevent by chemical such as abscisic acid and phenolic acids present in the seed prevent germination.
Inhibitory substances in dormant seed can be removed by subjecting seed to ascorbic acid.

243. Germination of seed inside fruit is a peculiar characteristic
(a) mangrooves/halophytes
(b) mesophytes
(c) xerophytes
(d) emergant hydrophytes

BVP-2013

Ans. (a) : Germination of seed inside fruit is a peculiar characteristic mangroves/halophytes or called viviparous germination.
Mesophytes- plant grow moderate climates
Xerophytes- plant grow in dry condition.

244. The production and storage of energy in mitochondria increases during:
(a) seed germination (b) dormant seed
(c) ripening seed (d) seed maturation

AFMC-2001

Ans. (a) : The production and storage of energy in mitochondria increases during seed germination. The reserves food materials are rapidly oxidized and release energy for various biosynthetic activities going on in the germinating seed.

245. Secondary dormancy is due to the absence of
(a) suitable plant
(b) hormones
(c) favourable conditions
(d) unfavourable conditions

Haryana PMT-2011

Ans. (c) : Secondary dormancy is due to the absence of favourable condition. An important function of seed dormancy is delay germination which allows dispersal and prevents simultaneous germination of all seeds secondary dormancy occurs due to unfavourable conditions occur after the seed has been dispersed.

246. Which one of the following does not exhibit seed dormancy ?
(a) Rhizophora (b) Xanthium
(c) Phaseolus (d) Cassia

UP CPMT-2004

Ans. (a) : Rhizophora does not exhibit seed dormancy while being attached to the parent plant. As viviparous plant, Rhizphora creates a propagate that is in reality a living tree. Hence, option (a) is correct answer.

247. Removal of seed coat in dormant seeds, by mechamical method is called :
(a) separation (b) vernalization
(c) emasculation (d) scarification

AFMC-2000

Ans. (d) : Removal of seed coat in dormant seeds by meachanical method is called scarification. It involves weakening, breaking, opening, scratching or altering the coat of seed, testa, by chemical or mechanical method to encourage germination.

248. Energy for the early growth of a developing bean embryo comes from
(a) sunlight (b) water in the soil
(c) food in the soil (d) leaves in the seed

CG PMT-2007

Ans. (d) : Energy for the early growth of a developing bean embryo comes from leaves in the seed vave cotyledon which store food material for provided to the developing or germinating embryo. The cotyledons become leaf of the seed after seed germination leaf take energy from sun. The seed also develop young cotyledon leaves which provide energy for the development of the embryo. Seed plants have developed an evolutionarily better way to protect their young generation from harsh environmental.

249. Dry seeds can induce higher temperature that the germinating seeds because
(a) dry seeds have more reserve food
(b) hydration makes the enzymes more sensitive to temperature
(c) dry seeds are hard
(d) the seedlings are tender

CG PMT-2007

Ans. (b) : Dry seeds induce higher temperature that the germinating seeds because hydration makes the enzymes more sensitive. Dry seeds are produced by those plants that usually produce pods capsules and seed heads. Seed germination is a process by which the embryo inside the seed will give rise to a plant. The seed coat is mainly composed of proteins that will be broken down by the enzyme poteases.

250. The form of pigment which inhibits germination is:
(a) P_{760} (b) P_{730}
(c) P_{650} (d) all of these

Haryana PMT-2005
JIPMER-2005

Ans. (c) : The seed germination is promoted by red wavelength (650 nm) and inhibited by far red (730 nm). This is due to the pigment phytochrome behaving in the following manner.
Germination $\leftarrow P_{730} \rightleftharpoons P_{650} \rightarrow$ No germination

251. When a seed germinates, while fruit is still attached to plant
(a) vivipary (b) scarification
(c) germination (d) None of these

CG PMT-2006

Ans. (a) : When a seed germinates, while fruit is still attached to plant. This phenomenon is called vivipary. It is the phenomenon of germination of seeds inside the fruit while it is still attached to the parent tree, such adaptation is found in halophytes. Viviparous plants produce seeds that germinate before they detach from its parent.

252. Which of the following hormones can replace vernalisation?
(a) Auxin (b) Cytokinin
(c) Gibberellins (d) Ethylene

AIPMT-1989

Ans. (c) : Chailakhyan (1968) reported that under long - day conditions vernalin hormone turn into gibberellins and thus in some plants, the temperature for vernalisation is overcome by gibberellins.